

U.S. ARMY - BAYLOR UNIVERSITY

**RE-ENGINEERING EMERGENCY MEDICAL SERVICES
AT MONCRIEF ARMY COMMUNITY HOSPITAL
FORT JACKSON, SOUTH CAROLINA**

A GRADUATE MANAGEMENT PROJECT

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Abstract

This project involves the development and evaluation of four courses of action (COA) with the goal of finding a structure for emergency and traditional primary care services which would increase and improve access to primary care at Moncrief Army Community Hospital (MACH). The hypothesis of this study is that the MACH emergency medical services (EMS) can be re-engineered in a manner which will increase the efficient use of resources, while also maintaining, if not enhancing, the capability of providing MACH beneficiaries with optimal health care, and continuing to support the hospital mission. A description and a summary of the findings follow.

COA 1: Maintain the MACH ER in its Present Form. This COA seeks to determine if an emergency room (ER) is necessary for Fort Jackson. The assumption is that the ER is an essential mission and should therefore be maintained. This COA was found to be unacceptable because the data suggests there is little need for an ER, and these resources would be better used to improve routine primary care access.

COA 2: Establish a Department of Defense/Veterans Affairs (DOD/VA) Resource-Sharing Agreement with Dorn Veterans Administration Medical Center (DVAMC). This COA involves keeping the ER open, but supplementing funding with a resource-sharing agreement with the DVAMC. The DVAMC also operates an ER at questionable efficiency. In this COA, the DVAMC would close their ER and send their patients to MACH, reimbursing MACH on a cost-basis. This COA was also determined to be unacceptable. This would produce no net cost-savings to MACH, and would actually further hinder access to care for MACH beneficiaries at Fort Jackson.

COA 3: Convert the MACH ER into an Acute Care Clinic (ACC). This COA involves closing the MACH ER. To handle the primary care needs of the Fort Jackson community, the resources used to operate the ER would be used to convert the ER into an ACC, open only when other access to care is not. This COA permits the opportunity to fast-track patients and thus improve the efficiency of providing patient care. This COA was found to be acceptable, and would result in an estimated annual net savings of over 1.8 million dollars. It would improve access to care, but might result in a disincentive for some to enroll in TRICARE Prime.

COA 4: Convert ER Resources to Alternate Methods of Primary Care Delivery. This COA, which was developed by a MACH Primary Care Task Force, also involves closing the ER but using those resources for five alternative methods of primary care delivery. These alternate forms of care include: 1) a 24 hour nurse advice line; 2) a Soldier Assessment Center, which would triage and provide basic treatment to soldiers after normal clinic hours; 3) extended hours for the Family Health Center; 4) extended hours for the Troop Medical Clinic; and 5) emergency care at local civilian ERs. This was found to be the most preferred COA because it would result in the most efficient use of resources, while improving access to primary care for the Fort Jackson community. The estimated annual net savings was approximately \$400,000.

Acknowledgments

Many kind, bright, and wonderful people made it possible for me to complete this project. I would like to acknowledge their very significant contributions and thank them for the guidance, support, and inspiration they provided.

Colonel R. Bernard Chapman, Jr. served patiently as my preceptor, and as the Chair of the Moncrief Army Community Hospital Primary Care Task Force, from which many of the ideas for the courses of action discussed here evolved. Major Carolyn Ambrose, Chief Nurse of the Moncrief emergency room, spent countless hours explaining to me how the emergency medical system works, and the likely impact of the proposals I explored. Many at Moncrief provided superb assistance in collecting and interpreting the data for this study. Especially helpful were Max Angell and Jeanette Radcliffe, who wrote many of the computer ad-hoc reports used to gather the descriptive statistics. Without them I would have been completely lost. Major John Gaal, a GMP veteran and a stellar Medical Service officer, provided a voice of reason and logic. Professor Kenn Finstuen served as my reader for this project and kept me on track during this challenging, yet rewarding experience. I thank you all.

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INTRODUCTION

Moncrief Army Community Hospital (MACH) is a general surgical and medical treatment facility, located at Fort Jackson, South Carolina. Fort Jackson is a Training and Doctrine Command (TRADOC) post, with the mission of conducting Basic Combat Training and Advanced Individual Training for newly recruited soldiers, as well as the Officer Basic and Advance Courses for the Adjutant General, Finance, and Chaplain Corps. The post population consists of mostly young, healthy soldiers and the training environment is structured and closely monitored, which results in remarkably few training accidents. (USA MEDDAC 1995), (Ambrose 1996)

MACH's mission is to fully support the Fort Jackson training mission while providing the highest quality, comprehensive health care and maintaining a high state of contingency preparedness. As part of its mission MACH operates an emergency medical service (EMS), which is in operation twenty-four hours per day, seven days per week. This EMS is authorized a staff of thirty-eight, and consists of an emergency room (ER) and an ambulance service. The ER and ambulance service are not integrated, but operate separately. (USA MEDDAC 1996), (Ambrose 1996)

On July 1, 1996, MACH began operations as part of the Region 3 TRICARE Program. The impact of this was: 1) A more intensified focus on outpatient care. 2) A decrease in the hospital inpatient census. 3) An intensification in efforts to develop more efficient methods for the use of resources in accomplishing the hospital mission. One such innovation was the establishment of a Family Health Center (FHC), which serves as a

primary care provider for TRICARE Prime enrollees, and provides care for non-enrollees on a space-available basis. The FHC sees patients from 0730 until 2000, Monday through Friday. (Humana 1996)

MACH also operates the McWethy Troop Medical Clinic (TMC), which supports the majority of the active duty primary care needs, and assists the FHC with some immunizations. The TMC operates from 0700 to 1630, Monday through Friday, and from 0700 to 1200 on Saturdays. When the FHC and TMC are closed, beneficiaries often choose to receive primary care at the MACH ER. Historical access to primary care for the Fort Jackson Community is illustrated in figures 1 and 2. (Ambrose 1996)

FIGURE 1
HISTORICAL WEEKDAY PRIMARY CARE ACCESS AT FORT JACKSON

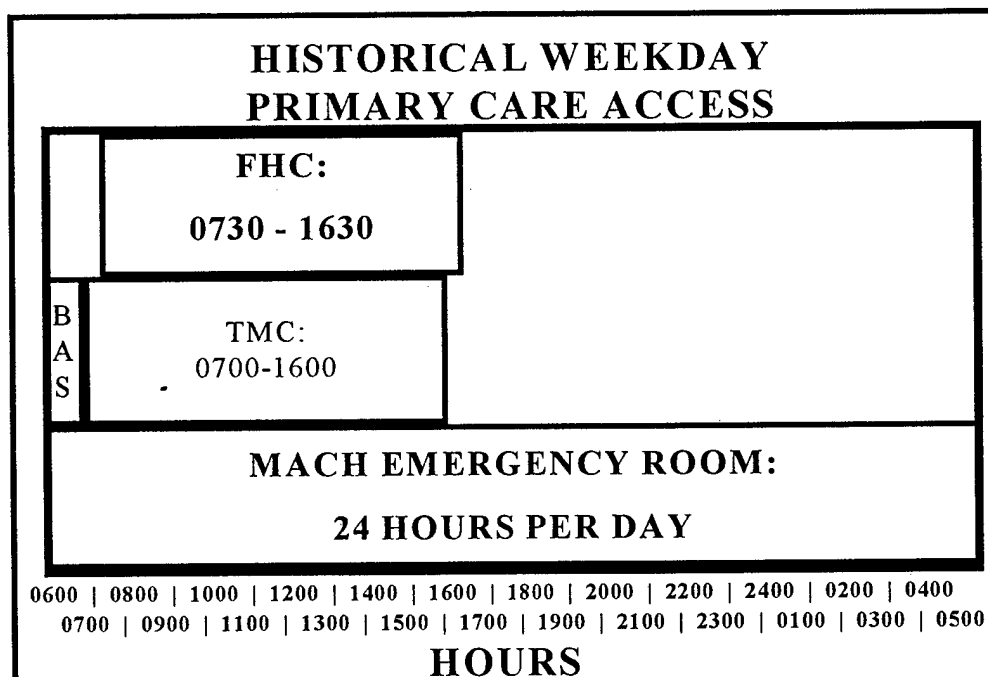
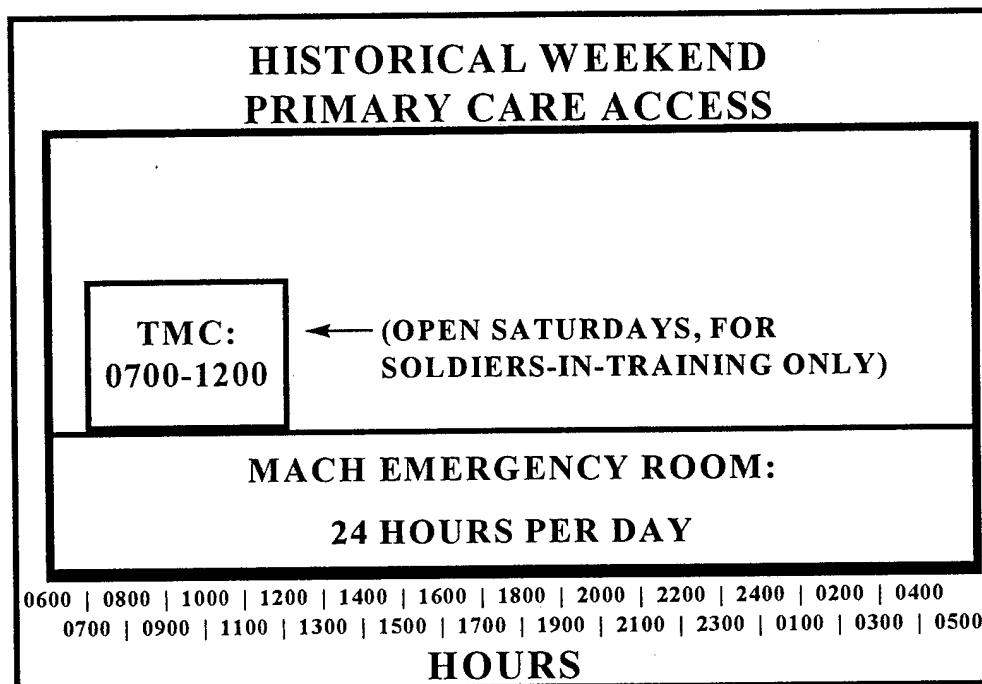


FIGURE 2
HISTORICAL WEEKEND PRIMARY CARE ACCESS AT FORT JACKSON



Conditions Prompting the Study

In October 1996, the Southeastern Regional Medical Command (SERMC) informed the MACH leadership that the organization's core medical budget for fiscal year (FY) 1997 was to be decremented 13.7%. This equates to a \$3,545,000 reduction from the FY96 budget. The additional requirement to fund FY97 civilian pay raises and medical inflation rates have an even greater impact on this situation. (Corley 1996)

Another concern which may significantly affect how MACH conducts business is a recent Department of Defense/Heath Affairs (DOD/HA) initiative known as Enrollment-Based Capitation (EBC). This initiative will change the current method the Department of

Defense uses to fund military treatment facilities (MTFs). EBC would allocate funding "based primarily on (TRICARE PRIME) enrolled beneficiaries, adjusted by appropriate demographic variables (e.g., age/sex) with special considerations for medical readiness and training." (Martin 1997) The impact of such an allocation system will require the MTFs to focus on finding new methods to encourage eligible beneficiaries to enroll in TRICARE Prime, and discourage a form of "moral hazard" among some individuals who presently access the Military Health Service System (MHSS). Moral hazard occurs when the cost of obtaining health care is so low that demand for that care might become unrestrained. (Feldstein 1993). In this situation, individuals who are in a position to take advantage of the circumstances to obtain some form of profit (i.e., free health care) without exposing themselves to risk, are known as "free-riders." (Davids 1990)

The current, and likely future increase in the strain on scarce health care resources will challenge MACH to look closely at all services and departments to find ways to improve efficiency. This may result in an elimination of some services, re-engineering or combining departments, or developing resource-sharing agreements with other facilities.

The MACH leadership is actively exploring areas which have a potential for better resource utilization. Several Task Forces (TF) and Process Action Teams (PAT) have been developed for this purpose. Areas being studied for possible re-engineering include the FHC, the Department of Pediatrics, the Department of Surgery, the Intensive Care Unit (ICU), the Post-Anesthesia Care Unit (PACU), inpatient care wards, and the EMS. There are also PATs and TFs studying ways to develop a Short Stay Observation Unit, and a Nurse Advice Telephone Line. Possible improvements and the effects these may

have on MACH's mission, patient care, work-load, staffing, equipment, supply and overhead costs, and impacts on other services or departments in their ability to provide care are included in the charters for these TFs and PATs. (Simons 1997)

The patient acuity of the MACH EMS has traditionally been low, which suggests that there may be opportunities for better use of these resources. This might be accomplished in various ways, such as combining the ER and ambulance service, establishing EMS resource sharing agreements with the local Dorn Veterans Administration Medical Center (DVAMC), or converting the ER into an Acute Care Clinic (ACC).

Providing emergency medical care is a complex process governed by many legal and regulatory requirements. MHSS facilities are subject to most of these regulations, plus the additional requirements of the Department of Defense. Re-engineering emergency medical services thus demands a thorough study of not only available resources, but regulatory concerns as well. Before any decisions regarding health care re-engineering at MACH will be made, the command group must have access to the information developed from such a study.

Statement of the Research Question

How can Moncrief Army Community Hospital re-engineer its EMS assets in a way that will utilize resources in the most efficient manner, yet continue to provide optimal patient care in support of the MACH and Fort Jackson missions, without negatively impacting other hospital departments and services?

Access to appropriate health care for the Fort Jackson military and civilian beneficiary population is a vital concern for the leadership of MACH. This is the primary mission of this facility. Resources are scarce, which means that better and more efficient ways to provide care must be developed. However, as with most health care facilities, many of the services in this hospital depend upon other services to some degree in their ability to continue providing care successfully. Any plan to re-engineer EMS assets must therefore not only increase the efficiency with which resources are utilized at MACH, but must also avoid degrading other services, while maintaining, and preferably improving access to primary care.

Literature Review

There is a broad source of literature available which supports and guides efforts required to answer the research question. The stream of past research documentation includes studies involving cost analyses, staffing evaluations, health care facility re-engineering, ER access, patient satisfaction, and innovations which reduce ER demand. There are also cases of other MHSS facilities which have studied closing their EMS, as well as internal MACH restructuring and manpower studies, and documents written by the MACH EMS leadership which recommend changes.

Methods and considerations for determining emergency department costs are outlined in the literature (Miller, et al 1993), (Williams 1996), as well as considerations for evaluating ER resource sharing between VA and DOD facilities. The literature suggests such agreements may result in an increased use of ER resources, due primarily to the

usually higher acuity levels of elderly VA beneficiaries. This implies the need to evaluate additional costs associated with ancillary services (radiology, laboratory, and pharmacy) in treating geriatric or chronically ill patients in the ER. (Lindberg, et al 1992)

Concerns over downsizing medical facilities are addressed in several publications. Re-engineering efforts can have unexpected costs which should be considered (Arndt and Bigelow 1996), but which may be minimized by employing rational steps in the evaluation of unnecessary staff positions. (Barrett 1995) Information is available to assist in developing plans for integrating ER and ambulance service assets (Snead and Porter 1996), as well as options for cutting costs without eliminating staff. (Thomas and Moore 1996)

The high costs and crowded conditions in ERs can be a burden for hospitals and patients. Excess demand may result in delays in treatment, no treatment, or unnecessary costs. (Baker and Baker 1994), (Derlet and Denyse 1990) Past solutions to cost and increased patient problems include fast-tracking, which involves shifting minimally ill patients from the ER to other less resource-intensive forms of care. (Simon, et al, 1996) Another innovation is the use of emergency treatment help lines. (Stark, et al, 1994)

MACH is not the first U.S. Army Medical Activity to explore restructuring its emergency medical assets. Lyster Army Community Hospital, Fort Rucker, Alabama, recently studied the benefits of closing its ER. An important lesson learned from this experience was the need to break out workload by time and patient category. It was also mentioned that closing the ER can have an impact on inpatient workload since some ER cases result in admissions. There may also be an impact on TRICARE in the form of

increased issue of Non-Availability Statements (NAS), which could result from not having an ER. (Bell, 1996) This is a concern to the leadership of MACH, since it may negatively impact the TRICARE contract Bid Price Adjustment (BPA) for MACH. (Montgomery 1997)

From January 1995 to August 1996, the MACH EMS leadership expressed the need for restructuring the EMS. They circulated memorandums which briefly described proposals and justifications for change, such as reducing ambulance crew staffing requirements, transferring weapon range support missions to military ambulance crews, integrating the ER and ambulance service, and transferring the ambulance service mission to the Fort Jackson Fire Department. However, until the method for which funding was allocated to MTFs was revised, there was little need or incentive to implement such changes. With the recent implementation of TRICARE, this situation changed. (Ambrose 1996), (Peeler 1995)

A management study of ambulance services was conducted in 1984 by the MACH Resource Management Division (RMD). The purpose of this study was to determine the most efficient structure for ambulance service staffing. At that time, there were two separate ambulance services at MACH. The emergency ambulance service (EAS) served the post emergency transport mission, and the field ambulance service (FAS) (which was part of the MACH Plans, Operations and Training Division) provided weapons range medical coverage. The study recommended these two services be combined to reduce duplication of resources, resulting in the present MACH ambulance service. It also included methods for estimating workload, staffing requirements, and analyzing costs.

Much of this study was based on Medical Expense and Performance Reporting System (MEPRS) data. (Dixon and Chapman 1985)

Available literature on the subject of re-engineering EMS includes official regulations, policies and guidance, which impact the design and scope of the EMS at MACH. The US Army Medical Command (MEDCOM) dictates responsibilities, procedures and staffing requirements for Army Medical Activity (MEDDAC) ERs. The integration of the ER and ambulance service is specifically outlined, as are requirements for staffing levels and education. Procedures for implementing changes to EMS are addressed as well. (HSC Regulation 40-5), (HSC Pamphlet 40-7-18)

The DOD has published a great deal of guidance regarding business process re-engineering, business decision models, and resource sharing. This literature includes steps for evaluating re-engineering proposals in situations similar to the MACH EMS. One method outlined is for determining "business sense/cost" and the resulting impact on readiness and on patients. (Hart 1995) Implementation strategies for DOD/VA sharing arrangements are covered in federal and research publications. (DOD/HA Memorandum 1996), (McGee and Hudak 1995), (GAO 1995)

Purpose of the Study

The primary purpose of this study is to assist the leadership of MACH in making decisions regarding the future structure of hospital emergency medical assets. This includes developing models of potential, future EMS structures, evaluating current policies and procedures, and developing recommendations for changes which will define

and guide the implementation of the decisions made.

The independent variable in this study is the structure of primary care services at MACH, which includes the EMS. Dependent variables include staffing salary costs, workload, beneficiary time costs, beneficiary “out-of-pocket” dollar costs, ancillary health care service requirements, supply costs, legal and regulatory impacts, and impacts on the MACH mission (which includes patient care).

The variables mentioned above may be either dependent or independent variables, depending on which structure is being evaluated. For example, mission would be an independent variable if weapon range coverage was transferred to the Fort Jackson Fire Department, or if the ER was converted into an ACC. However, mission would be a dependent variable if the ER staff remained constant, but the workload increased because of a sharing agreement which involved MACH treating VA beneficiaries.

Hypothesis

The hypothesis of this study is that the MACH EMS can be re-engineered in a manner which will increase the efficient use of resources, while also maintaining the capability of providing MACH beneficiaries with optimal health care, and continuing to support the hospital mission.

METHOD AND PROCEDURE

Methods for conducting this study involve developing practical COAs which MACH might implement to improve both resource utilization management and access to

primary care. Each COA will then be evaluated to determine if one (or more) supports the hypothesis. If the research findings reveal that more than one COA supports the hypothesis, a recommendation will be developed for which one of these COAs MACH should implement. The four COAs developed and evaluated for this study are briefly described below.

COA 1: Maintain the MACH ER in its Present Form

This COA focuses on determining the actual need for an ER at Fort Jackson. The premise is that the ER is an essential service and should therefore be maintained. There are five beneficiary population subgroups that must be evaluated. These include 1) Fort Jackson's "Soldiers-In-Training" (SITs); 2) The Fort Jackson active-duty, permanent-party soldiers; 3) the civilian dependents of active-duty members; 4) military retirees and their dependents under the age of 65; and 5) military retirees and their dependents age 65 and over. For this COA to be acceptable, it should be determined that the ER is efficient and necessary, which would support the null hypothesis - the MACH EMS cannot be re-engineered in such a way that will make it more efficient.

COA 2: Establish a DOD/VA Resource-Sharing Agreement with the DVAMC

This COA involves keeping the ER open, but supplementing funding with a resource-sharing agreement with the Dorn Veterans Administration Medical Center (DVAMC). The DVAMC also operates an ER at questionable efficiency. The concept of COA 2 is for the DVAMC to close their ER and send their ER patients to MACH.

MACH would then be reimbursed for these patients on a cost-basis. For COA 2 to be acceptable, it must be demonstrated that an ER resource-sharing agreement between MACH and the DVAMC will improve efficiency in resource utilization, and improve access to health care for all Fort Jackson beneficiaries. In this COA, maintaining access to care for VA beneficiaries at a reduced cost is the goal of the DVAMC. Reducing the cost of maintaining an ER is more of a concern for MACH than is maintaining access to primary care for VA beneficiaries.

COA 3: Convert the MACH ER into an Acute Care Clinic (ACC)

This COA involves closing the MACH ER. To handle the primary care needs of the Fort Jackson community, the resources used to operate the ER would be used to develop and operate an Acute Care Clinic (ACC), which would only be open when the TMC and FHC are not. This COA permits the opportunity to fast-track patients, which allows MACH the opportunity to better manage the efficiency of providing patient care, as well as to reduce the "free-riders" that have the capability to enroll in TRICARE Prime, or to receive care under the Medicare program. For COA 3 to be acceptable, access and resource-utilization must improve as a result of converting the ER into an ACC.

COA 4: Convert ER Resources to Alternate Methods of Primary Care Delivery

This COA, which was developed by a MACH Primary Care Task Force, involves closing the ER and using those resources in four alternative methods of primary care delivery. These alternate forms of care include 1) a 24 hour nurse advice line; 2) a soldier

assessment center (SAC) which would triage and provide some treatment to soldiers after normal clinic hours; 3) extended hours for the Family Health Center (FHC) which include evenings and weekends; and 4) extended hours for the Troop Medical Clinic (TMC), which includes evenings until 2300, and the addition of Sunday clinic hours. (MACH PC-PAT Minutes 1997)

Methods and procedures also include workload measurement and estimation, cost-determination, and regulatory evaluation. The events studied include every MACH EMS case in a 184 day period. This 184-day period was used because of the recent implementation of the DOD's TRICARE program and corresponds to when TRICARE was implemented at MACH (1 July 1996), which caused some alteration in the patterns of access to care. Many beneficiaries (both CHAMPUS-ineligible and non-TRICARE Prime enrollees) who could previously access primary health care services at MACH with relative ease were now given a lower priority for care. With TRICARE, these subgroups can only access primary care on a "space-available" basis.

It is understandable that this might result in an increase in the number of people seeking primary care in the ER. While MACH's primary care clinics began to focus their energies on caring for TRICARE Prime enrollees, the ER must continue to see all who seek care there. For this reason, ER demand history prior to July 1996 is likely to be misleading when used to evaluate the effects of re-engineering on the structure of primary care at MACH. The period from 1 July to 31 December 1996 was therefore selected for data collection for this study.

Each event must be further subdivided in a way which provides the ability for meaningful analysis of the efficiency of resource use and patient care. Initially, this was to be accomplished by categorizing treatment levels according to the diagnosis of the patient, the supplies and equipment used during the treatment, the time and intensity required for treatment, medications prescribed, etc. However, this proved to be extremely time-consuming, as each of the 17,148 cases would have to be evaluated individually. This also required an ER clinician's medical opinion for each case, which was not practical. Therefore, the categories of triage established in Standard Form 558 - non-urgent, urgent, and emergent, were used instead. These triage categories are determined for each ER case as it is entered into the Composite Health Care System (CHCS) database. This eliminated the need to re-evaluate the status of each ER visit studied.

Since a resource-sharing arrangement with the Dorn VA Medical Center is one COA, their ER workload also needed to be studied. A history of their ER demand, categorized in accordance with the definitions stated on Standard Form 558, serve as a logical indication of how such a resource-sharing agreement would affect access to care in the ER for the Fort Jackson community.

Raw data for workload measurement was collected by the use of ad-hoc reports from CHCS. Additional cost-related data was collected with the use of MEPRS. Demand history data requirements for DVAMC were collected in a similar manner through the VA's Decentralized Hospital Computer Program (DHCP). Since the resource-sharing COA involves treating VA patients at MACH and all costs would be reimbursed, no VA cost data was required.

An estimation of MACH's future EMS and ancillary service demand was to be accomplished by calculating daily averages for patient acuity levels from the data collected for workload during the study period. This was to be used to calculate a workload index for each acuity level by dividing the average case-load per acuity level into the Resource Analysis and Planning System (RAPS) population data for the data-collection period. Future demand was then to be estimated by applying these workload indices to RAPS population projection data. This however proved to be non-beneficial since demand will now be affected by TRICARE Prime enrollment, which is voluntary and for which no significant history exists for this area. This would therefore not be reflected in RAPS data.

An average cost per case for each primary care access site at MACH, as well as for ER treatment at local civilian facilities was required to evaluate some COAs. This was to be accomplished by using a resource-based relative value scale (RBRVS) system. (Finkler 1995) This too proved to be an unacceptable method for collecting the information required because it eventually required determining all cost allocations for the entire facility. It was discovered that using MEPRS data produced a more accurate average cost per case, since all hospital cost center step-down allocations are established by MACH's RMD via MEPRS. Mixing RBRVS system and MEPRS data resulted in many unresolvable inconsistencies, thus adversely affecting both validity and reliability.

The development and evaluation of each COA included a review of applicable laws, regulations, and standards. DOD, VA, MEDCOM, and South Carolina state regulations presented issues to be resolved, and are discussed in the findings for the various COAs.

Mission accomplishment and patient care and satisfaction are key concerns of the MACH leadership. It was therefore essential that research methods included an exploration of the commander's intent, departmental and section leaders' input, as well as a review of applicable internal Standing Operating Procedures (SOP) and policies. Much of this guidance came in the form of the charters of the various PATs, which were established by the MACH commander.

The content validity of variables in this study was evaluated from literature which examines emergency room cost-finding, workload evaluation, staffing and demand management innovations, and DOD/VA resource sharing projects. As COAs were developed, subject-matter experts were used to assist in judging validity. A high degree of validity and reliability was expected, since the data management systems used at MACH (CHCS and MEPRS) have been in place for some time. It was assumed that policy refinements, staff training and experience with these systems provided sufficient stability, equivalency, and internal consistency. (Cooper and Emory 1995) However, this did not always prove to be the case. Instances of missing data elements were found for many of the cases. To improve reliability of the data in instances where there were missing elements, the entire case was dropped from the sample.

Efforts were taken to insure that the methods and procedures for this study presented no ethical dilemmas. Confidentiality of patient records was insured by excluding the patient's name, social security number, and unit from all ad-hoc reports. This was also the case for all of the data collected from the DVAMC.

Demand for Access to the MACH ER

The demand for ER services must be determined in order to evaluate the changes in accessibility and in cost, which would result from re-engineering the ER. This is important because it not only involves several categories of patients which will be affected, but also because it will determine the necessity for actually keeping the ER open.

There are three triage categories used in the MACH ER to classify the severity of patients. These are non-urgent, urgent, and emergent. Standard Form 558, which is used for documenting ER cases, directs that patients be classified as emergent if there is "a condition which requires immediate medical attention and for which delay is harmful to the patient; such a disorder is acute and potentially threatens life or function." An urgent classification is used when there exists "a condition which requires medical attention within a few hours or danger can ensue; such a disorder is acute but not necessarily severe." The non-urgent classification is used for "a condition which does not require the immediate resources of an emergency medical services system; such a disorder is minor or non-acute." (US Printing Office 1982)

MACH ER demand data was collected for a six month period, from 1 July 1996 to 31 December 1996. This period was selected because beginning 1 July 1996, the TRICARE Prime military health care plan was established at MACH. The impact of this program on the ER was not yet fully realized, because the mix of patients who previously had access to all MACH facilities was altered somewhat. Enrollment into the TRICARE Prime program is not available for military retirees age 65 and older because only CHAMPUS-eligible patients may enroll. This is a controversial issue because, though

they are now generally covered under the Medicare program, many of these people feel they should have access to health care in a military facility, as was promised to them for the service they provided their country. This preference for health care through the MHSS by people with a lower priority for appointments in a traditional primary care setting may cause an increase in ER demand. Military retirees younger than 65 can enroll in TRICARE Prime, but at an annual enrollment cost of \$230 per individual or \$460 per family. This may be a disincentive for some eligible beneficiaries to enroll. These "free-riders" are of significant concern since their decision on whether or not to enroll in TRICARE Prime may have a major impact on MACH's future under EBC. (TRICARE Marketing Office 1997), (Martin 1977)

Originally data on 18,827 ER cases were gathered for this study covering this six-month period. However, there were some cases for which there was one or more data elements missing. Such cases were dropped from the study sample, with a final sample size of 17,148 ER cases. To develop an accurate estimate of future demand in cases where data elements were missing, an index was developed from the original sample size and applied to the available data. The data were collected from CHCS input for the following categories. Patient complaint category, patient triage or treatment category, age, sex, managed care status, ambulance utilization, access time, time seen by a provider, actual care value (ACV) code, CHAMPUS eligibility category, military rank, and use of ancillary services.

The patient complaint category is not a standard CHCS entry and was therefore was entered into the system in "free-text," which means that the wording of this data field

was left to the discretion of the processing clerk. This was therefore a difficult data element to study, requiring some degree of interpretation and the assistance of the ER staff. The patient triage category is mutually exclusive and categorically exhaustive, and consists of either emergent, urgent, or non-urgent categories. This was therefore a relatively easy data element to study.

Data was collected on patient ages and placed into the following subgroups. Patients below the age of 17 years, patients between the ages of 17 and 38 years, patients between the ages of 38 and 64, and patients age 65 and over. This information was intended to provide descriptive statistics regarding pediatric cases (ages 0 to 16), cases that fall generally within the range of active duty soldiers (ages 17 to 38), patients that generally fall within the range of CHAMPUS-eligible military retiree cases (ages 39 to 64), and those cases which fall within the Medicare-eligible category (ages 65 and over).

Managed care status, which consists of eligibility for enrollment in TRICARE Prime and the actual enrollment status for those eligible, is important in determining future demand (and therefore costs) in a system with a primary focus on treating the TRICARE Prime population. However, it was a difficult statistic to develop because the TRICARE Program was so recently established at MACH. Data regarding managed care status has been identified as somewhat faulty because of mis-coding. MACH shares its CHCS system with Shaw Air Force Base (AFB). Many of the entries in the CHCS record are misleading regarding the managed care enrollment status for individuals because some were assigned incorrect primary care managers. This is also adversely affected by the inconsistency of basic trainees managed care status entries into CHCS. For this reason,

age was determined to be a more accurate method of determining managed care eligibility.

One requirement of the study was to determine how many of the ER cases during the study period were either TRICARE Prime enrolled, eligible for TRICARE Prime enrollment but not enrolled, or not TRICARE Prime enrollment eligible. This information was important to know because in the event that the ER is closed, it will be possible to limit access to only those beneficiaries who are eligible and have chosen to enroll in TRICARE Prime.

An attempt to determine managed care status was also made by collecting data first by Patient Category (PATCAT). PATCAT data is used in CHCS through an interface with the Defense Enrollment Eligibility System (DEERS). This essentially provides information on each person who has been entered into the database regarding their eligibility for care under CHAMPUS. The PATCATs are broken down into nine categories for each of the five services (Army, Air Force, Navy, Marine Corps, and Coast Guard). For the purpose of this study, only data for the Army and Air Force were collected. The other services were excluded in order to reduce data collection requirements. Only the Army and Air Force are significantly represented in the MACH CHCS database, because this system is only shared between MACH and Shaw AFB. The majority of the eligible beneficiaries are therefore either Army or Air Force.

The nine PATCAT codes for each service include: active duty (code 11), dependents of active duty (code 41), dependents of deceased active duty (code 45), retirees who retired by completing the full length of service (code 31), dependents of retirees (code 43), reservists (code 12), reservists on inactive duty for training (code 22),

dependents of deceased retirees (code 47) and ROTC (code 21). The categories are further coded by branch of service. The letter "A" before each code designates the individual as Army, and the letter "F" designates Air Force. The 18 codes queried in CHCS therefore consisted of A11, A41, A45, A31, A43, A12, A22, A47, A21, F11, F41, F45, F31, F43, F12, F22, F47, and F21.

To further determine managed care status, information had to be collected on the Actual Care Value (ACV) code. There are multiple ACV codes within the CHCS system which correspond to such things as CHAMPUS eligibility or where the person is enrolled in a managed care plan (MCP), which can exclude persons accessing the MACH ER from outside of the catchment area. For the purpose of this study, only 6 of these codes proved to be of value. These were: ACV A (Active duty/MCP enrolled), ACV C (CHAMPUS/direct care eligible), ACV D (MCP enrolled/CHAMPUS ineligible), and ACV E (MCP enrolled/ direct care CHAMPUS eligible). As was mentioned previously, despite this research the results of this effort proved to be unreliable. For this reason, this data was discarded and patient age and military rank (if applicable) were used instead.

Military rank was determined by pay grade, which ranges from Enlisted (or "E") 1 through 9, and Officer ("O") 1 through 11. This information was needed primarily to determine which of the cases seen in the ER during the study period were soldiers in training (SITs), which being newly recruited into the military, are generally within the rank of E1 and E2. This information was essential since MACH's primary mission is to support the Fort Jackson recruit training mission. Any plan that includes closing the ER would have to insure that primary care access for these SITs was planned for. Such a plan would

have to include historical access patterns for SITs, to include the time of day and day of the week, for access to not only the ER, but to the TMC as well.

Data regarding access to MACH's ER by ambulance was needed to determine the need for this resource-intensive service, as well as to plan for alternative access at local civilian ERs. Ambulance service demand in this study involves only use of the MACH EMS. Any patients brought to MACH by outside ambulances are not considered relevant, since these are usually non-military beneficiary emergencies that are transported to MACH's ER simply because of its proximity. In the event that the ER was closed, these cases would no longer arrive at MACH, but would instead be transported to one of several local, more comprehensive civilian emergency treatment facilities, such as Richland Memorial Hospital (RMH) or Providence Hospital.

A large portion of the cost of ER visits are believed to result from the use of ancillary services. These services, which include radiology, laboratory, and pharmacy are separate departments from the ER. Therefore, demand data on each of these services by ER patients must be collected. Initially this was to be done by costing-out each procedure for each of these services. This proved to be extremely time-consuming as well as inaccurate, since there are many other cost centers within MACH that are "stepped-down" by RMD to these departments through MEPRS. Exact costs for pharmacy services were calculated, but in the end the allocation methods used in MEPRS were preferred for reasons of consistency.

THE RESULTS

It was determined that COA 4 - closing the MACH ER and converting these resources into other forms of primary care access, would result in the most efficient use of resources, and maintain or even improve access to primary care for the Fort Jackson community. The estimated annual net savings was \$396,797.48. This COA also insured that the quality of care received was not reduced as a result of re-engineering.

COA 3 - converting the MACH ER into an ACC was determined to be the next most efficient option. This would result in an estimated annual net cost savings of \$1,826,215.96. This also insured that the ability to receive quality emergency medical care was not adversely affected. This COA did however require that SITs and military dependent family members be treated in the same location. This is a disadvantage because it prevents the ability to maintain the highly-disciplined and structured basic training environment for the SITs, which is considered essential for the success of the Fort Jackson basic training mission.

COA 2 - developing a resource-sharing agreement with the DVAMC was determined to be an unacceptable option because it neither improved the efficiency of resource utilization, nor increased access to primary care for the Fort Jackson community. In this COA, the ER would remain operational, yet access to primary care for the Fort Jackson beneficiaries would most likely decrease as a result of access by the higher acuity VA patients. Reimbursement under this resource-sharing arrangement would therefore not be great enough to make it worthwhile.

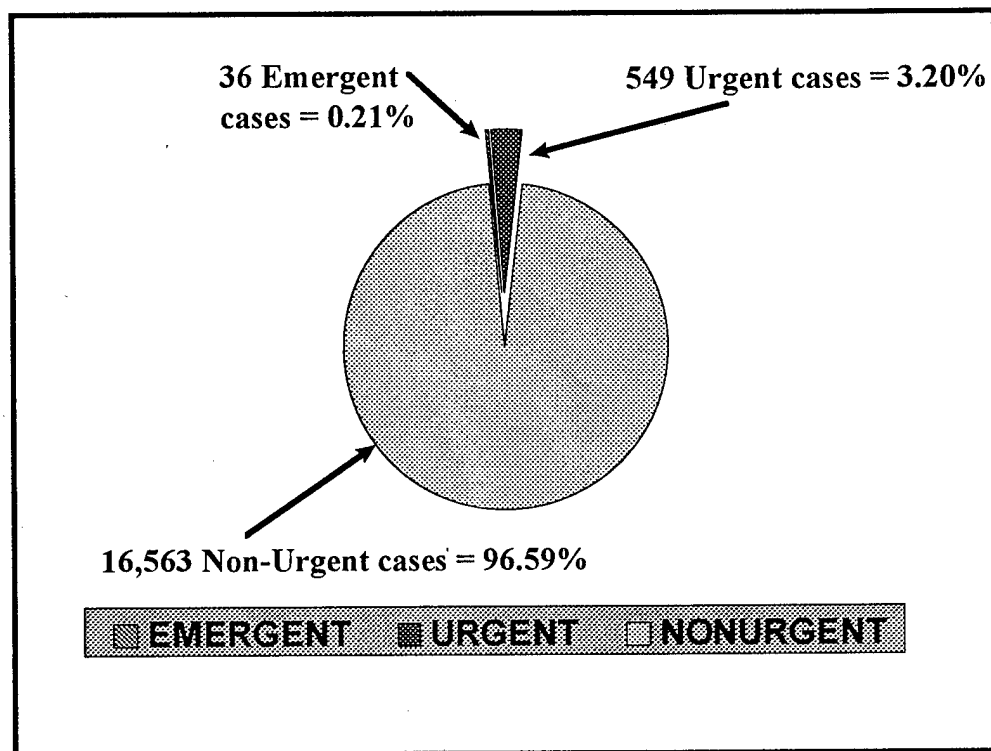
COA 1 - which involved maintaining the current structure for emergency medical assets at MACH was also determined to be unacceptable. Statistics were developed which indicated that the demand for ER services at MACH are of too low an acuity to warrant such an expensive service. The study of this COA also illustrated that the ER is actually being used as an alternative access point for traditional primary care needs. It is suggested that what is needed at Fort Jackson more than an ER, is improved access to basic primary health care.

Further discussion of these four COAs suggests that there may be immeasurable costs to closing the ER. Such costs include the erosion of the image of MACH as a community hospital, military medicine, and the US Army, as well as damage to the morale of active duty soldiers and their family members.

COA 1: Maintain the MACH ER in its Present Form

A study of the historical demand of MACH ER cases resulted in the determination that an ER at Fort Jackson is unnecessary. COA 1 is therefore not considered to be an efficient or practical way to continue providing primary care to the Fort Jackson community. Of all cases seen in the ER in a six month period, the vast majority (96.59%) were non-urgent. An extremely small portion of these cases were emergent or urgent, which are the cases ERs are intended to care for.

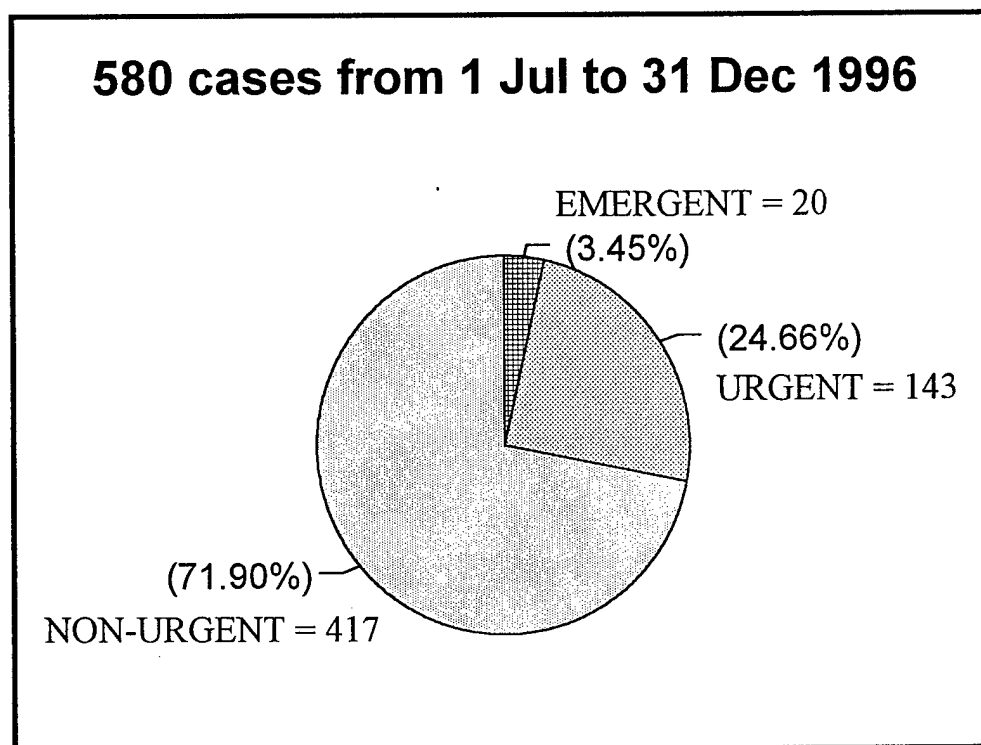
FIGURE 3
MACH ER CASES (1 July to 31 December 1996)



At MACH, the ER is not often used to treat true emergent, or even urgent cases. The national average for emergent and urgent cases reporting to ERs is 45.8% of all visits. (Stussman 1997) At MACH, emergent and urgent cases reporting to the ER account for only 3.41% of all visits, which is well below the national average and is an indication that better access to traditional primary care is needed more than an ER. In the event that an emergency does arise, such cases are likely to be transported by ambulance from MACH to local civilian ERs. Of the 36 emergent cases at MACH's ER during the data period, 20 (or 56%) were transferred elsewhere. Additionally, the majority of ambulance runs

(71.9%) were for non-urgent cases. (CHCS 1997) This is a significant indication that the resources required to operate the MACH ambulance service are not being utilized as efficiently as they might possibly be.

FIGURE 4
MACH AMBULANCE SERVICE DEMAND



An evaluation of the local community reveals that several medical facilities with fully-staffed ERs are all located within 5 to 18 minutes driving time from MACH. These times and distances are provided in table 1. (Boulet 1997)

TABLE 1
DISTANCE AND DRIVING TIMES TO LOCAL MEDICAL FACILITIES

| COLUMBIA, SC MEDICAL FACILITIES | MILEAGE FROM MACH | AMBULANCE TRAVEL TIME |
|------------------------------------|----------------------|--------------------------|
| Dorn Veterans Hospital | 5.1 | 5 minutes |
| Richland Memorial Hospital | 12.3 | 10 minutes |
| Providence Hospital | 5.3 | 8 minutes |
| Baptist Memorial Hospital | 6.6 | 10 minutes |
| Lexington County Memorial Hospital | 18.9 | 18 minutes |

A study of the peak ER access times reveals the greatest demand is between the hours of 0800 and 2100. These are hours when alternative primary care services (the TMC and FHC) are also available at MACH. How does this compare to other ERs across the country? Figures 5 and 6 provide a comparison of ER visit times at MACH with ERs across the United States in 1995. The access pattern at MACH is similar to that of the majority of other ERs across the country. However, since MACH's ER acuity level is so significantly lower than the national average, this may indicate that the ER at MACH is used more for traditional primary care overflow cases than for true emergent and urgent care access. (Stussman 1997) (CHCS 1997)

FIGURE 5
AVERAGE DAILY ER DEMAND TIMES FOR ALL AGES

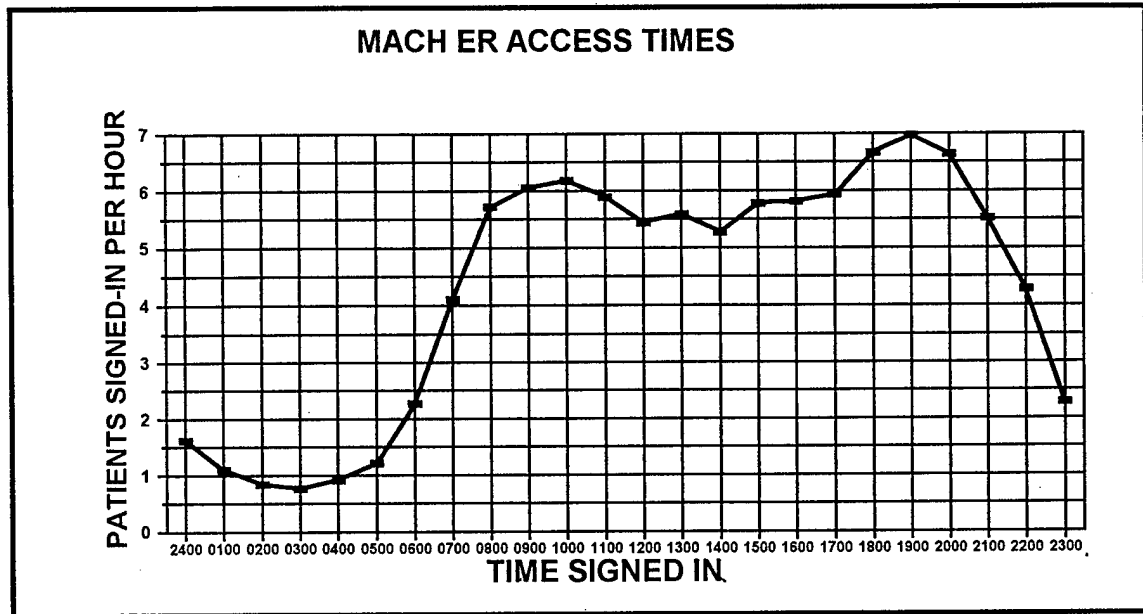
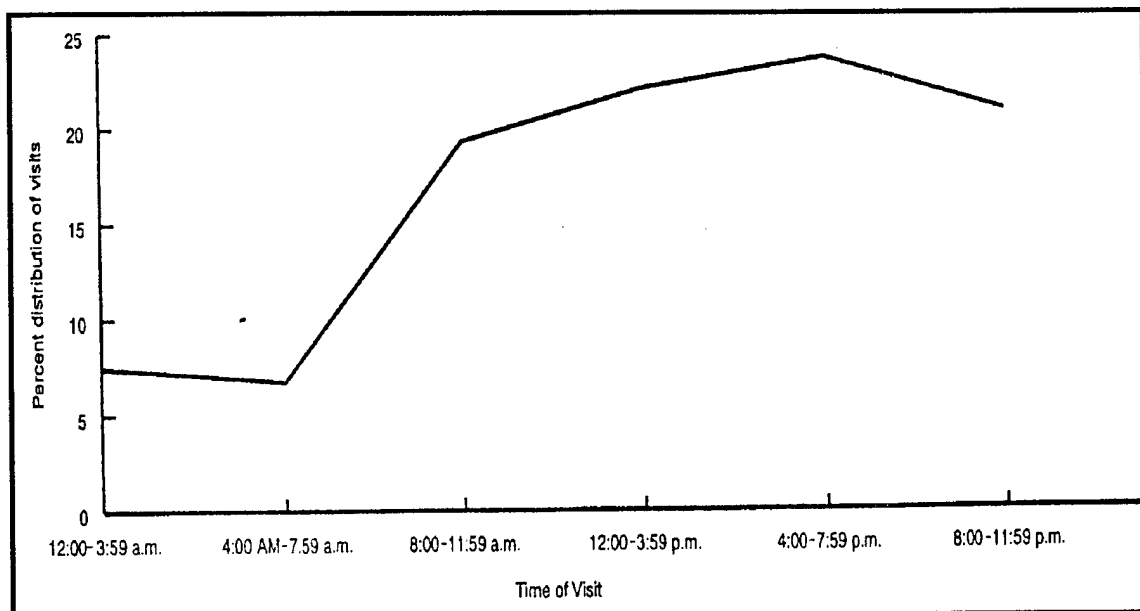
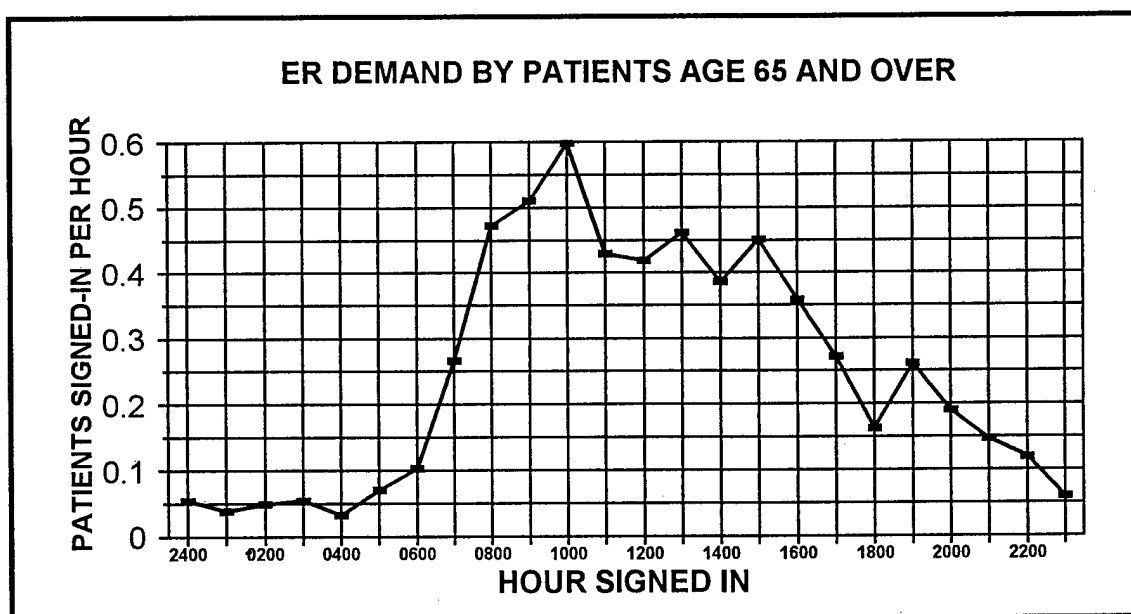


FIGURE 6
PERCENT DISTRIBUTION OF ER VISITS BY
TIME OF VISIT: UNITED STATES 1995 (Stussman 1997)



When specific population subgroups are studied, a relationship is seen between ER access by age group. As is illustrated in figure 7 below, the peak ER access hours for persons age 65 and older are generally the same hours that the FHC is open for business, which may support the assumption that this group is using the ER for primary care when they are unable to get appoints at the FHC on a space-available basis.

FIGURE 7
MACH ER ACCESS TIMES BY MEDICARE ELIGIBLE BENEFICIARIES



It may also appear that these hours for access are due to a higher than normal proportion of persons age 65 and greater. This however, is not the case. Figure 8 (which was developed from data from the US Dept of Health and Human Services, Centers for Disease Control for the year 1995), can be used to compare ER access in approximately the same age categories as were used for this study, with ER access across the United States. By comparing figure 8 with figure 9, it appears that MACH is not atypical in the percentage of visits for most age groups, and actually has significantly fewer (6.30% versus 14.59%) Medicare-eligible visits than are seen across the nation.

FIGURE 8
1995 UNITED STATES ER PATIENT AGES

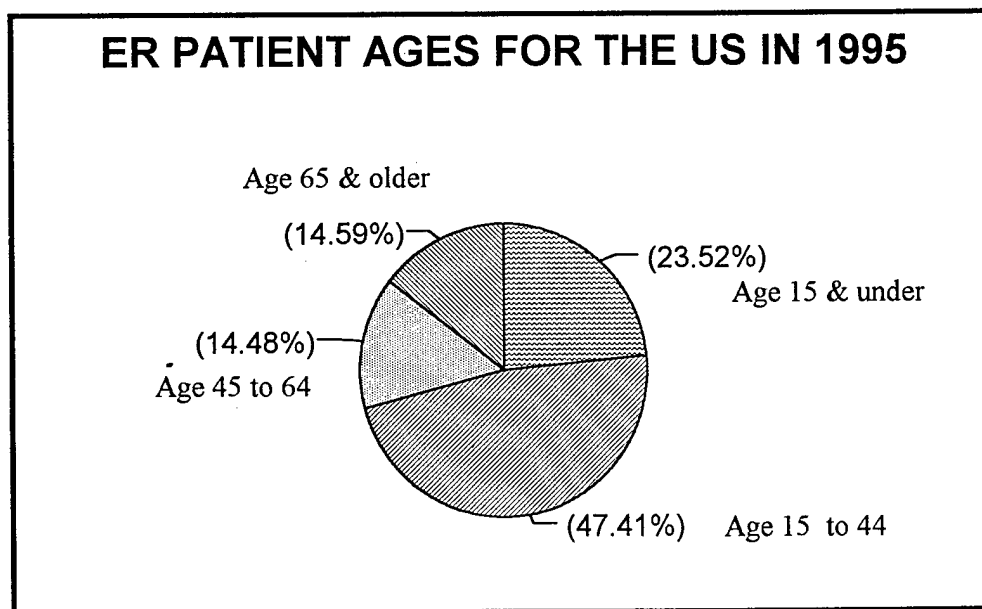
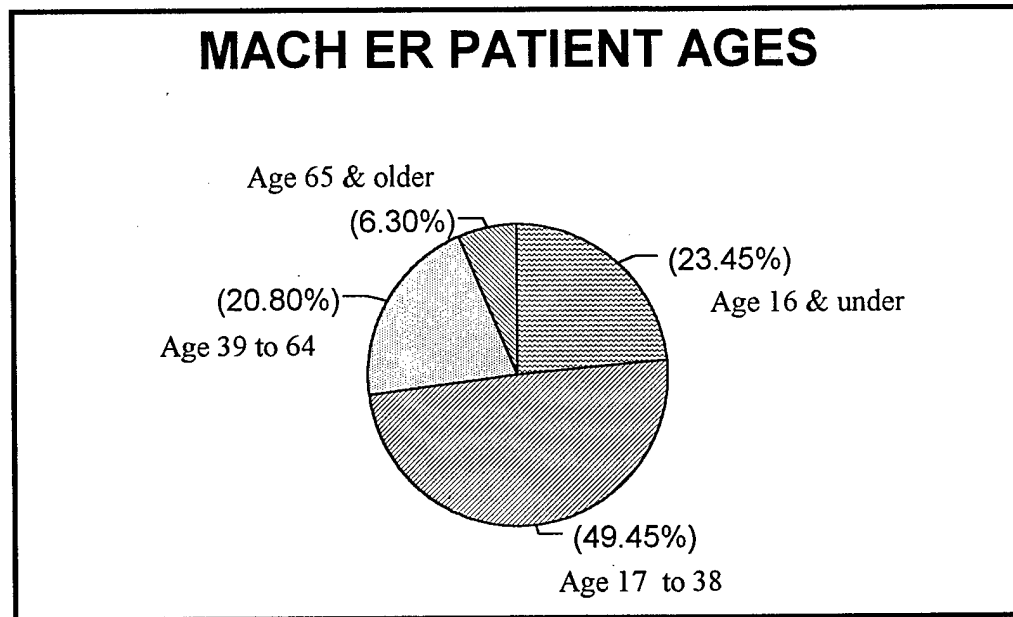
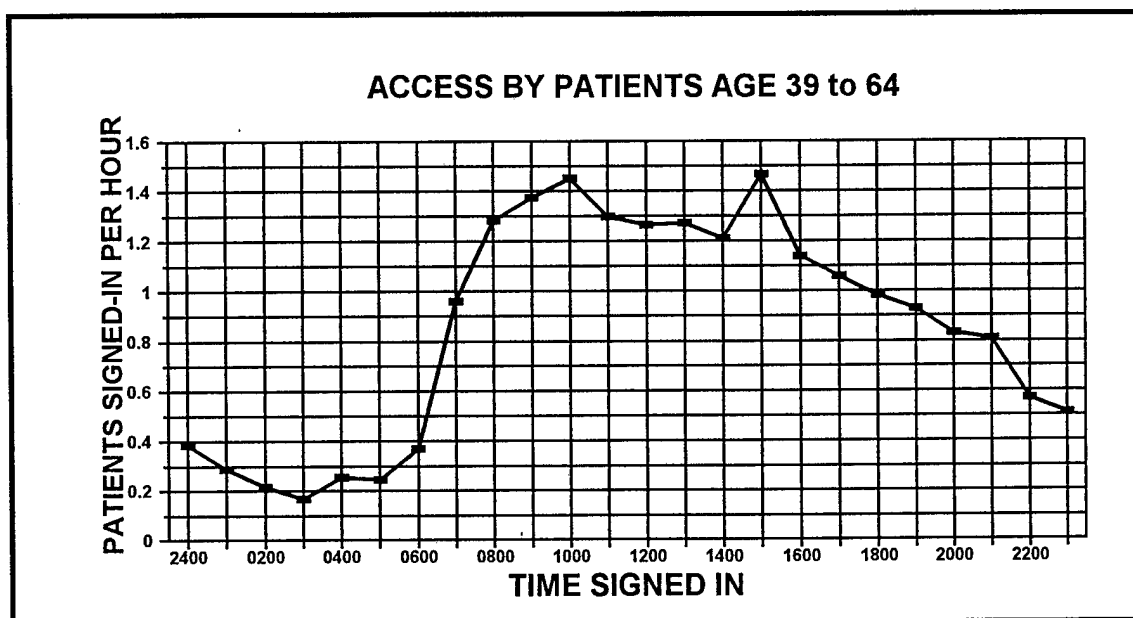


FIGURE 9
AGES OF MACH ER PATIENTS



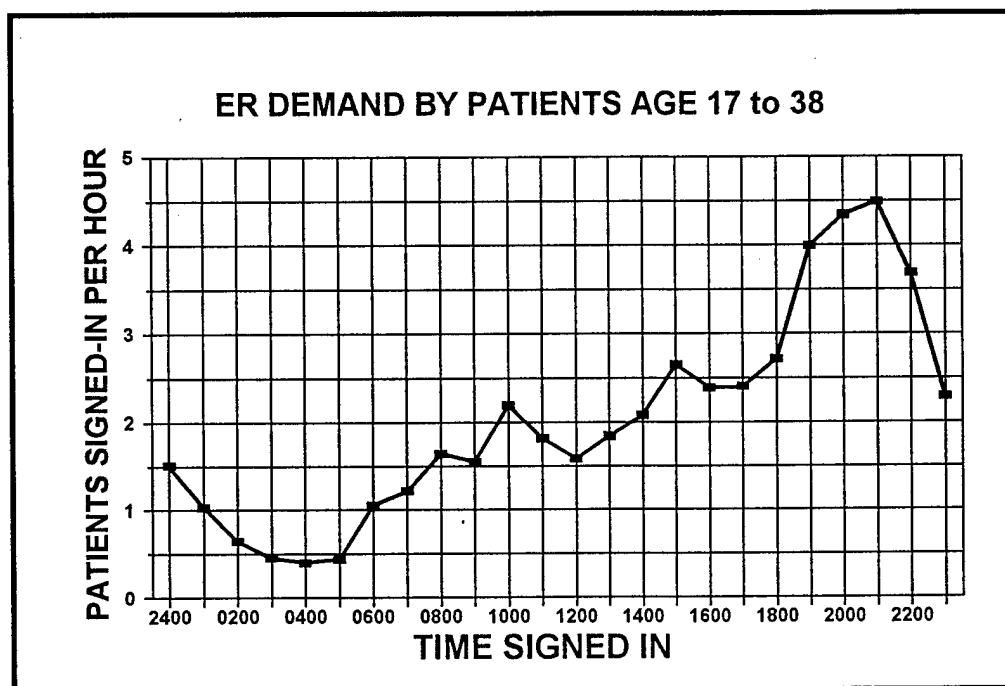
Military retirees who are not yet eligible for Medicare, and are therefore CHAMPUS/TRICARE Prime eligible, found themselves with a new financial decision to make as a result of the TRICARE program. With TRICARE Prime, guaranteed access to care at MACH or its TRICARE network partners requires an annual payment of from \$230 to \$460 for these CHAMPUS/TRICARE-eligible retirees and their families. The alternative to paying the TRICARE Prime enrollment fee is to compete with Medicare-eligible beneficiaries for space-available appointments at the FHC. Figure 10 shows ER access times for this group is greatest between 0730 and 1600, which are high-demand appointment hours at the FHC. This may also indicate that access to care in the ER is occurring in-lieu of space-available appointments in the FHC.

FIGURE 10
MACH ER ACCESS TIMES BY BENEFICIARIES AGE 39 TO 64



Persons between the ages of 17 to 38 predominately constitute the SITs, active duty members, and their dependents. These are the primary beneficiary populations MACH is expected to provide care for. For this group, figure 11 shows that peak ER access occurs only after the TMC and the FHC have closed. Figure 9 showed that this age group comprises 49.45% of all ER patients. This is an indication that this population also generally uses the ER for access to primary care, which further supports the need more for additional primary care access than an ER.

FIGURE 11
MACH ER ACCESS TIMES BY BENEFICIARIES AGE 17 TO 38



This data must be further evaluated to determine the ER access patterns of the SITs, which are the focus of the primary mission of MACH and Fort Jackson. The only other option for primary care access than the ER for these SITs is the TMC, but this closes at 1600. Figure 12 outlines ER access by soldiers in the pay grade E-1 to E-2, which primarily include SITs. This illustrates the movement of SITs from the TMC to the ER at approximately the same time the TMC closes. The marked decrease in access at approximately 1200 and 1700 each day correlates with the approximate lunch and dinner times for the Basic Training and Advanced Individual Training units. The period between 1400 and 1600 illustrates the time period that the TMC is usually at peak operating

capacity and therefore must begin to refer additional patients to the ER. These soldiers must now go to the ER in order to receive primary care. Perhaps if the TMC hours were extended, SIT demand at the ER would decrease as a result. This possibility, as well as the associated cost benefits, will be explored later in COA 4.

FIGURE 12
CUMULATIVE DAILY MACH ER ACCESS TIMES BY ARMY E1s AND E2s

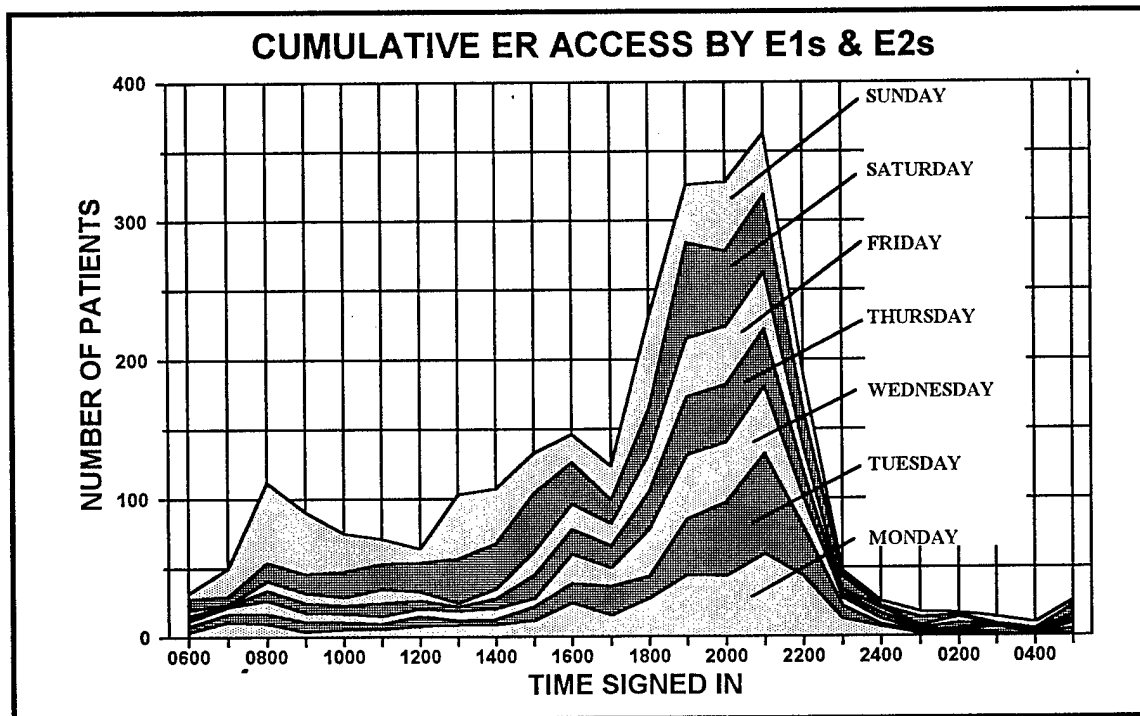
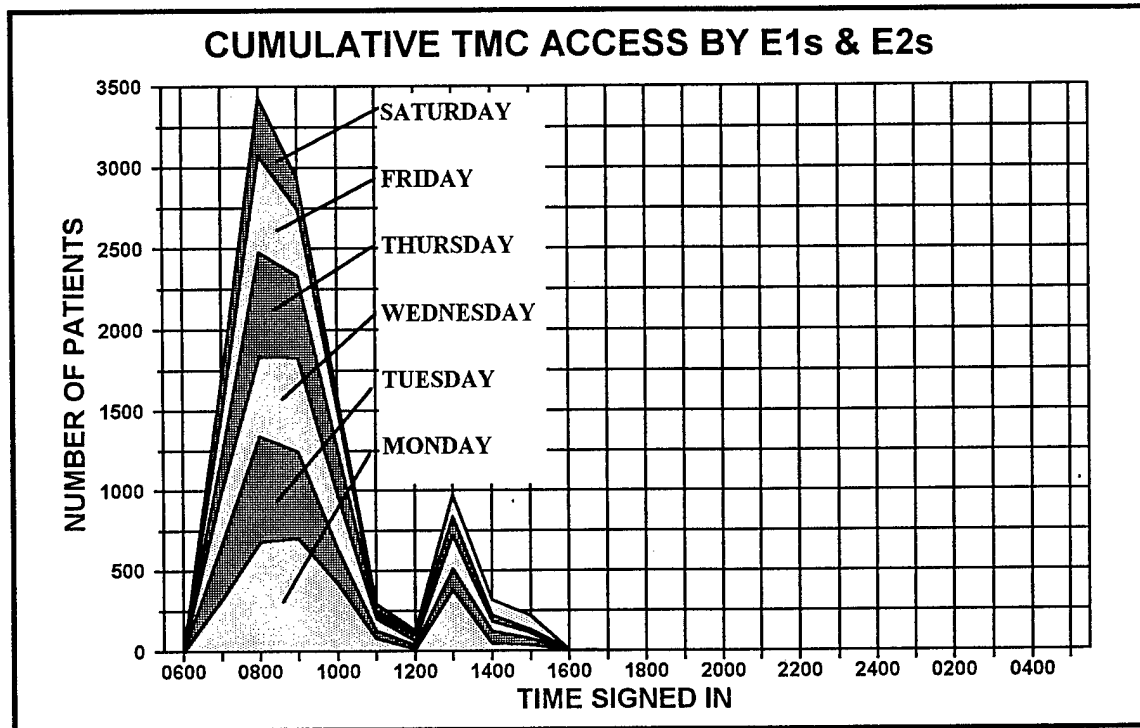


FIGURE 13
CUMULATIVE DAILY TMC ACCESS TIMES BY ARMY E1s AND E2s



Figures 1 through 13 illustrate that the MACH ER is seldom used for true emergencies, or even for urgent cases. Instead, it is used as an access point for non-urgent primary care. This might not be of concern if the cost of providing primary care at the ER were as efficient as it is at the FHC or the TMC. However this is not the case. The average cost per visit in each facility is listed on the following page in table 2.

TABLE 2
AVERAGE COST PER VISIT (OCT-DEC 96)

| COST CENTER | ER | FHC | TMC |
|---------------------|-----------------|----------------|----------------|
| RADIOLOGY | \$13.14 | \$10.03 | \$ 6.24 |
| LABORATORY | \$11.60 | \$ 9.49 | \$ 2.23 |
| PHARMACY | \$20.72 | \$21.06 | \$ 7.97 |
| RESPIRATORY THERAPY | \$.042 | \$0.67 | \$.57 |
| EKG | \$0.69 | \$0.56 | \$0.05 |
| MILITARY LABOR | \$26.57 | \$11.65 | \$14.91 |
| CIVILIAN LABOR | \$12.37 | \$21.85 | \$2.35 |
| CONTRACT LABOR | \$9.46 | N/A | N/A |
| SUPPLIES | \$3.04 | \$0.56 | \$0.63 |
| OVERHEAD | \$20.91 | \$18.96 | \$14.15 |
| TOTAL | \$118.54 | \$94.83 | \$49.10 |

From 1 October to 31 December 1996, the FHC saw 13,763 visits, at an average cost of \$94.83 each. In the same period the TMC saw 20,298 visits at an average cost of \$49.10. To determine a weighted average cost per visit, the percentage of total visits is determined for the FHC ($13,763 \div 34,061 \times 100$) = 40.41%. The percentage of visits seen at the TMC: ($20,298 \div 34,061 \times 100$) = 59.59%. Therefore, the average cost per primary care visit: $(\$94.83 \times .4141) + (\$49.10 \times .5959) = \$68.53$. It is clear that paying an average cost of \$118.54 per ER visit to provide non-urgent, primary care, is both impractical and inefficient. COA 1, maintaining the present EMS structure at MACH, is therefore determined to be unacceptable.

COA 2: Establish a DOD/VA Resource-Sharing Agreement with DVAMC*

This COA is also deemed impractical and inefficient for two reasons: 1) accepting the DVAMC's ER patient load will only serve to worsen the problem of primary access at Fort Jackson, and 2) the cost associated with caring for more elderly, chronically, and acutely ill patients, would be counter-productive to other re-engineering efforts at MACH.

The most frequent patient complaint by condition category for MACH are listed in table 3 below. (Ambrose 1997), (CHCS 1996)

TABLE 3
COMMON MACH ER PATIENT COMPLAINTS BY TRIAGE CATEGORY

| NON-URGENT | URGENT | EMERGENT |
|---|---|---|
| sprains, strains, upper respiratory infection, urinary-tract infection, skin rash, ear infection, minor trauma, medication refill, mild allergic reaction, nausea/vomiting | rule-out fracture, syncope episode, pediatric fever, dehydration | asthma, pneumonia, rule-out heart attack, drug-overdose, eye injury |

A comparable list of DVAMC ER patient complaints follows in table 4. This list covers the period 27 January 1997 through 2 February 1997, and includes the top 30 diagnoses by frequency during this 7-day period. To insure consistency in the treatment categories of these samples, the DVAMC data was evaluated by a MACH ER physician, who determined which category (emergent, urgent, and non-urgent) each type of case would be placed in if they were seen at the MACH ER. (Simonis 1997), (Baldwin 1997)

TABLE 4
COMMON DVAMC ER PATIENT COMPLAINTS BY TRIAGE CATEGORY

| DIAGNOSIS | FREQUENCY | CONDITION CATEGORY |
|-----------------------------------|-----------|--------------------|
| unknown cause morbidity/mortality | 25 | non-urgent |
| acute upper respiratory infection | 7 | non-urgent |
| painful respiration | 6 | urgent |
| chronic airway obstruction | 4 | non-urgent |
| syncope/collapse | 4 | urgent |
| hypertension | 4 | non-urgent |
| urinary tract infection | 3 | non-urgent |
| convulsions | 3 | urgent |
| osteoarthro disease | 3 | non-urgent |
| emphysema | 3 | non-urgent |
| acute gastritis with hemorrhage | 2 | emergent |
| bronchitis | 2 | non-urgent |
| acute bronchitis | 2 | non-urgent |
| acute tonsillitis | 2 | non-urgent |
| acute pharyngitis | 2 | non-urgent |
| congestive heart failure | 2 | urgent |
| anxiety state | 2 | non-urgent |
| sickle-cell anemia | 2 | non-urgent |
| respiratory abnormality | 2 | non-urgent |
| backache | 2 | non-urgent |
| lumbago | 2 | non-urgent |
| shoulder joint pain | 2 | non-urgent |
| cellulitis of digit | 2 | non-urgent |
| viral pneumonia | 2 | urgent |
| chronic sinusitis | 2 | non-urgent |
| angina pectoris | 2 | urgent |
| hypovolemia | 2 | non-urgent |
| nausea with vomiting | 1 | non-urgent |
| HIV disease | 1 | non-urgent |
| esophageal reflux | 1 | non-urgent |

A comparison of these cases in table 5 below reveals that the percentage of urgent and emergent cases seen at the DVAMC is considerable higher than those seen at MACH.

TABLE 5
COMPARISON OF MACH, DVAMC, AND US ER PATIENT TRIAGE CATEGORIES

| CATEGORY | MACH | DORN VH | 1995 US AVERAGE |
|------------|--------|---------|-----------------|
| EMERGENT | .21% | 2.02% | * 22.9% |
| URGENT | 3.20% | 19.19% | * 22.9% |
| NON-URGENT | 96.59% | 78.79% | 54.20% |

* Separate emergent and urgent data for US averages was unavailable.
Therefore, the combined total of 45.8% was divided equally.

This arrangement might be beneficial to MACH if the DVAMC would share the cost for the ER physician contract (which totals \$744,950.40 per year), since both organizations currently have to pay the full salaries for these costly physicians. (Gier 1997) However, the VA/DOD Resource-Sharing Memorandum of Understanding established in 1993 requires that in such an arrangement, MACH could be reimbursed only for the actual costs of the services the DVAMC received. (VA/DOD MOU 1993) This means that MACH would still be required to pay the \$744,950.40 per year, and only offset this expense by the amount these physicians were used to treat VA patients. This produces no real advantage to MACH since, to properly care for these cases, the additional resources required for higher acuity patients (such as an ICU) must also be maintained at MACH, whether the VA uses them or not. If MACH does not maintain these additional services for higher acuity cases, such patients would simply have to be returned back to the DVAMC (or the more expensive RMH) upon diagnosis and stabilization.

As of April 1997, MACH and the DVAMC were in the process of negotiating an agreement which would permit MACH to transfer its ICU resources and capability to DVAMC. This would virtually eliminate MACH's capability to care for many of these higher acuity cases commonly seen in the DVAMC ER. (DVAMC/MACH 1997)

There are reasons that make an ER resource-sharing agreement between MACH and the DVAMC seem desirable. Such an arrangement would improve MACH's bartering position in trading for other services (such as ICU) with the DVAMC. If MACH could provide ER services to DVAMC, the cost to MACH of receiving ICU care at DVAMC would be offset to some degree, reducing the likelihood that MACH would have to make a reconciliation payment to the VA at the end of the fiscal year. An unplanned financial requirement such as this could be devastating for the hospital's budget. (Corley 1996)

However, the focus of this study is to look at ways to improve access to primary care for the Fort Jackson Community. In this COA, the ER would remain operational, yet access to primary care for the Fort Jackson beneficiaries would most likely decrease as a result of the higher acuity VA patients utilizing the MACH ER. Cost-reimbursement under this resource-sharing arrangement would not be enough to make it worthwhile, which is a problem identified in past research. (Lindberg, et al 1992)

Since COA 2 would not improve the efficient use of resources, and would actually be detrimental to the ability of the Fort Jackson community to access health care, this COA is determined to be unacceptable.

COA 3: Convert the MACH ER into an Acute Care Clinic (ACC)

This COA involves closing down the MACH ER and using these resources to operate an ACC. This situation may permit a reduction in costs, since there would no longer be a requirement to pay the high contract ER physician salaries, since physician extenders and general medical officers could be used instead. This is also likely to reduce the demand for ancillary services as well as permit limiting access to TRICARE Prime enrollees only, since this could be a clinic exclusively for TRICARE Prime enrollees. (Wright, et al 1992)

Instead of operating 24 hours per day, the ACC would be open only when the FHC and TMC are not. This permits the opportunity to fast-track patients to more suitable means of care. For example, when someone signs into an ER complaining of a non-urgent condition, the person must be seen regardless of how minor the condition might be. In a fast-track situation, the same patient reporting to an ACC could be directed to visit another clinic such as the TMC or FHC, during normal clinic duty hours. This would allow MACH the opportunity to better manage the efficiency of providing patient care. It might also serve to as an enrollment incentive for those "free-riders" who are eligible to enroll in TRICARE Prime, since by not enrolling, they would then be limited to appointments only when TRICARE Prime appointments went unfilled.

The literature suggests that the cost of providing care in an ACC would be less expensive than in an ER setting. The exact cost savings is unknown and can only be estimated. In order to estimate the cost of operating an ACC, averages of the historical demand and costs for operating the TMC and FHC will be used, since the patient types

and conditions, as well as the medical capabilities available will be similar. (Wright, et al 1992), (Simon, et al, 1996)

One significant expense which would be affected by this COA is ER physician salaries. At MACH, physician staffing for the ER includes 3 military physicians, one government service (GS) physician, and 5 contract physicians. The contract for the 5 physicians covers 8,760 hours of service for a total cost of \$774,950.40, which equates to a cost of \$85.04 per hour. The average cost per hour for a GS physician is \$39.60 and \$26.03 for military. (Gier 1997), (USGS Pay 1997), (US Military Pay 1997)

Another issue is the demand for ancillary services in the ER. Past research concludes that, due to the nature of treating patients in an ER setting, there is a greater demand for the use of radiology, laboratory, and pharmacy ancillary services. (Wright, et al 1992) If the ER were converted to an ACC, the demand for these services would be expected to become similar to that of the TMC and FHC. To estimate the ancillary service demand for an ACC at MACH, the ancillary service demand for the ER, TMC and FHC was first calculated using MEPRS data from the data collection period. An average rate for each ancillary service per visit (which is listed below in table 6) was determined by dividing the total number of each ancillary services by the total number of visits for each clinic.

TABLE 6
A COMPARISON OF ANCILLARY SERVICE DEMANDS

| EMERGENCY ROOM | | | | | | | | AVG SVC |
|-----------------------|------------|------------|------------|------------|------------|------------|--------------|------------------|
| | JUL | AUG | SEP | OCT | NOV | DEC | TOTAL | PER VISIT |
| RADIOLOGY | 1,101 | 1,217 | 1,247 | 1,133 | 1,101 | 1,017 | 6,816 | 0.37 |
| LABORATORY | 3,355 | 3,514 | 3,409 | 3,246 | 3,693 | 3,336 | 20,553 | 1.12 |
| PHARMACY | 3,508 | 3,807 | 4,645 | 3,509 | 3,773 | 4,692 | 23,934 | 1.31 |
| TTL ER VISITS | 2,826 | 3,143 | 3,046 | 2,966 | 3,325 | 3,019 | 18,325 | |

| TROOP MEDICAL CLINIC | | | | | | | | AVG SVC |
|-----------------------------|------------|------------|------------|------------|------------|------------|--------------|------------------|
| | JUL | AUG | SEP | OCT | NOV | DEC | TOTAL | PER VISIT |
| RADIOLOGY | 451 | 431 | 400 | 408 | 421 | 582 | 2,693 | 0.06 |
| LABORATORY | 1,457 | 1,171 | 609 | 1,079 | 1,079 | 1,079 | 6,474 | 0.15 |
| PHARMACY | 8,490 | 8,171 | 6,006 | 7,341 | 8,350 | 6,146 | 44,504 | 1.04 |
| TTL TMC VISITS | 7,918 | 8,017 | 6,081 | 7,630 | 8,005 | 5,312 | 42,963 | |

| FAMILY HEALTH CENTER | | | | | | | | AVG SVC |
|-----------------------------|------------|------------|------------|------------|------------|------------|--------------|------------------|
| | JUL | AUG | SEP | OCT | NOV | DEC | TOTAL | PER VISIT |
| RADIOLOGY | 1,170 | 1,248 | 1,420 | 1,377 | 1,056 | 1,220 | 7,491 | 0.28 |
| LABORATORY | 3,974 | 4,167 | 4,273 | 4,750 | 4,047 | 3,622 | 24,833 | 0.93 |
| PHARMACY | 2,894 | 2,936 | 2,761 | 5,790 | 5,567 | 6,325 | 26,273 | 0.98 |
| TTL FHC VISITS | 4,186 | 4,495 | 4,368 | 5,061 | 4,262 | 4,440 | 26,812 | |

These calculations illustrate that the demand for each type of ancillary service is significantly greater per visit at the ER than at the FHC or the TMC. If the ER were converted to an ACC, the demand for ancillary services could be reduced significantly, as is shown in table 7 below.

TABLE 7
ACUTE CARE CLINIC ANCILLARY SERVICE REDUCTION

| ACC SAVINGS IN ANCILLARY SERVICES | | | |
|--|-----------|------------|--------------------------|
| ANCILLARY SERVICE | ER | ACC | PERCENT REDUCTION |
| RADIOLOGY | .37 | .17 | 54.05 % |
| LABORATORY | 1.12 | .54 | 51.79 % |
| PHARMACY | 1.31 | 1.01 | 22.90 % |

MEPRS provides an average cost per visit for the ER, FHC, and the TMC. Since the cases seen at an ACC would be similar in acuity and cost as those for the TMC and FHC, an estimate for the average cost per visit for an ACC is calculated by taking an average for each cost center in the FHC and TMC. Table 8 provides a comparison of these costs for the ER, FHC, TMC, and the estimate for an ACC.

TABLE 8
A COMPARISON OF ESTIMATED AVERAGE ACC COSTS PER VISIT

| ESTIMATED AVERAGE COST PER VISIT (Oct-Dec FY96) | | | | |
|--|-----------------|----------------|----------------|----------------|
| COST CENTER | ER | FHC | TMC | ACC |
| RADIOLOGY | \$13.14 | \$10.03 | \$ 6.24 | \$ 8.14 |
| LABORATORY | \$11.60 | \$ 9.49 | \$ 2.23 | \$ 5.86 |
| PHARMACY | \$20.72 | \$21.06 | \$ 7.97 | \$ 14.52 |
| RESPIRATORY THERAPY | \$0.42 | \$0.67 | \$0.57 | \$0.62 |
| EKG | \$0.69 | \$0.56 | \$0.05 | \$0.31 |
| MILITARY LABOR | \$26.57 | \$11.65 | \$14.91 | \$13.28 |
| CIVILIAN LABOR | \$12.37 | \$21.85 | \$2.35 | \$12.10 |
| CONTRACT LABOR | \$9.46 | N/A | N/A | N/A |
| SUPPLIES | \$3.04 | \$0.56 | \$0.63 | \$0.60 |
| OVERHEAD | \$20.91 | \$18.96 | \$14.15 | \$16.56 |
| TOTAL | \$118.54 | \$94.83 | \$49.10 | \$71.99 |

Table 9 uses the estimated average cost per visit to determine resources which would be required in an ACC setting, to treat all the cases seen in the ER during the data collection period.

TABLE 9
COST SAVINGS OF TREATING HISTORICAL MACH ER WORKLOAD IN AN ACC

| COST SAVINGS OF TREATING ER CASES IN AN ACC | | | |
|--|---------------|------------------|----------------------|
| | <i>DEMAND</i> | <i>UNIT COST</i> | <i>TOTAL COST</i> |
| MACH ER | 17,148 | \$118.54 | \$2,032,723.92 |
| ACC | 17,148 | \$71.99 | \$1,234,484.52 |
| | | SAVINGS: | \$ 798,239.40 |

Although this table does include all the cases which reported to the MACH ER during the data collection period, this estimate can be revised somewhat because an ACC setting will allow MACH to permit non-TRICARE Prime beneficiaries access only on a space-available basis. However, any estimates for this effect must assume that anyone who is eligible may decide to enroll in TRICARE Prime. Therefore, only those who are not eligible will be removed from the demand estimates. This would eliminate only Medicare-eligible persons, which the data shows to be approximately 5.8% (or 1,080 cases) of those seen during the study period. The estimated cost-savings, derived from subtracting the Medicare-eligible beneficiaries from each treatment category is revised in table 10 below.

TABLE 10
REDUCTION IN POTENTIAL URGENT/EMERGENT MEDICARE-ELIGIBLE CASES

| REDUCTION IN POTENTIAL URGENT/EMERGENT CASES | | | |
|---|--------------|----------------------|--------------------|
| | TOTAL | 65 & OVER | REVISED TTL |
| NON-URGENT | 16,563 | 991 | 15,572 |
| URGENT | 549 | 83 | 466 |
| EMERGENT | 36 | 6 | 30 |
| TOTAL | 17,148 | 1,080 | 16,068 |

One additional revision to this estimate is also required. Although it is a relatively small number, 3.41% of MACH's ER these cases were either urgent or emergent. While some of the urgent cases might be treatable in an ACC setting, for the purposes of this study, a conservative stance must be taken. It will be assumed that MACH's clinicians will prefer to err on the side of caution, and would therefore send any questionable cases to one of the local civilian ERs. Cost data for visits to local Columbia, South Carolina ERs were obtained from the South Carolina Hospital Association. The charges are from the period October 1995 to September 1996, and are calculated from all Columbia, South Carolina area, non-federal hospitals. The average cost for an ER visit (regardless of category) is \$398.42. (SC Budget and Control Board 1997)

Table 11 includes the estimate for treating all cases that reported to the MACH ER from the period 1 July to 31 December 1996 in an ACC, and sending any cases that were determined to be either emergent or urgent to a civilian ER. These totals were calculated

after all Medicare-eligible beneficiaries were removed from the sample.

TABLE 11
COST OF TREATING MACH ER HISTORICAL WORKLOAD
IN AN ACC AND LOCAL COLUMBIA, SC CIVILIAN ERs

| COST FOR TREATING HISTORICAL MACH ER CASES IN AN ACC & CIVILIAN ERs | | | | |
|--|---|-----------------------------------|---|--------------------------|
| | <i>EMERGENTS & URGENTS</i> | <i>ALL NON-URGENTS</i> | <i>AVERAGE COST PER CASE</i> | <i>TOTAL COST</i> |
| LOCAL CIVILIAN ERs | 496 | | \$398.42 | \$197,616.32 |
| ACUTE CARE CLINIC | | 15,572 | \$71.99 | \$1,121,028.28 |
| | | | TOTAL: | \$1,318,644.60 |

Tables 6 through 11 include only the demand and cost estimates for the study period, which is only 6 months. Table 12 includes the annual cost savings at MACH as a result of converting the ER into an ACC.

TABLE 12
ANNUAL COST SAVINGS OF CONVERTING THE MACH ER INTO AN ACC

| ANNUAL COST SAVINGS | | |
|----------------------------|------------------------------|---------------------------|
| | <i>BI-ANNUAL COST</i> | <i>ANNUAL COST</i> |
| CURRENT ER | \$2,231,752.58 | \$4,463,505.16 |
| PROPOSED ACC | \$1,318,644.60 | \$2,637,289.20 |
| | SAVINGS = | \$1,826,215.96 |

The implementation of COA 3 would result in a significant cost savings, primarily as a result of reducing staffing costs and ancillary services demand. It would also decrease

the ability for non-TRICARE Prime enrollees to access care at MACH, which would serve as an enrollment incentive for those eligible to enroll. This is also a positive move toward preparing MACH for EBC. Although those beneficiaries who are eligible for Medicare would be further restricted in their ability to access care, this COA would improve access to care for the Fort Jackson community. COA 3 - converting the MACH ER into an ACC, is therefore determined to be an acceptable COA.

COA 4: Convert ER Resources to Alternate Methods of Primary Care Delivery

This COA was developed by a MACH Primary Care Task Force, which included an interdisciplinary team of clinicians, administrators, and support staff. This involves closing the ER and using its resources in five alternative methods of primary care delivery. These alternate forms of care include 1) a 24 hour nurse advice line; 2) a soldier assessment center (SAC), which would triage and provide some treatment to soldiers after normal clinic hours; 3) weekend hours for the FHC; 4) extended hours for TMC, which include evenings until 2300 and the addition of Sunday clinic hours; and 5) sending all urgent and emergent cases to local civilian ERs. The times and locations for health care access in accordance with COA 4 are illustrated in figures 14 through 17 on the following pages.

FIGURE 14
COA 4: WEEKDAY PRIMARY CARE ACCESS FOR SITs

| | | |
|--|--|--|
| PROPOSED WEEKEND ACCESS FOR SOLDIERS-IN-TRAINING | | |
| LOCAL CIVILIAN EMERGENCY ROOMS: 24 HOURS PER DAY | | |
| S A C | TMC: 0700-1200 | SOLDIER ASSESSMENT CENTER: OPEN WHENEVER THE TMC IS NOT |
| | MEDICAL ADVICE LINE: 24 HOURS PER DAY | |
| 0600 0800 1000 1200 1400 1600 1800 2000 2200 2400 0200 0400 0700 0900 1100 1300 1500 1700 1900 2100 2300 0100 0300 0500 HOURS | | |

FIGURE 15
COA 4: WEEKEND PRIMARY CARE ACCESS FOR SITs

| | | |
|--|--|---------------------------------|
| PROPOSED WEEKDAY ACCESS FOR SOLDIERS-IN-TRAINING | | |
| LOCAL CIVILIAN EMERGENCY ROOMS: 24 HOURS PER DAY | | |
| B A S | TROOP MEDICAL CLINIC: 0700-2300 | SAC: 2300-0700 |
| | MEDICAL ADVICE LINE: 24 HOURS PER DAY | |
| 0600 0800 1000 1200 1400 1600 1800 2000 2200 2400 0200 0400 0700 0900 1100 1300 1500 1700 1900 2100 2300 0100 0300 0500 HOURS | | |

FIGURE 16
COA 4: WEEKDAY PRIMARY CARE ACCESS FOR TRICARE PRIME ENROLLEES

| | | |
|--|--------------------------------|--|
| PROPOSED WEEKEND ACCESS FOR TRICARE PRIME ENROLLEES | | |
| LOCAL CIVILIAN EMERGENCY ROOMS: 24 HOURS PER DAY | | |
| | FHC 0730-1200 | |
| MEDICAL ADVICE LINE: 24 HOURS PER DAY | | |
| 0600 0800 1000 1200 1400 1600 1800 2000 2200 2400 0200 0400 0700 0900 1100 1300 1500 1700 1900 2100 2300 0100 0300 0500 HOURS | | |

FIGURE 17
COA 4: WEEKEND PRIMARY CARE ACCESS FOR TRICARE PRIME ENROLLEES

| | | |
|--|---|--|
| PROPOSED WEEKDAY ACCESS FOR TRICARE PRIME ENROLLEES | | |
| LOCAL CIVILIAN EMERGENCY ROOMS: 24 HOURS PER DAY | | |
| | FAMILY HEALTH CENTER 0730-2000 | |
| MEDICAL ADVICE LINE: 24 HOURS PER DAY | | |
| 0600 0800 1000 1200 1400 1600 1800 2000 2200 2400 0200 0400 0700 0900 1100 1300 1500 1700 1900 2100 2300 0100 0300 0500 HOURS | | |

The 24-hour nurse advice line is another innovation that was studied at MACH by a PAT. The concept of a nurse or medical advice telephone line is well-documented. This service is used to control unnecessary emergency room use, and depends on experienced nurses who triage callers over the phone. They are usually assisted with detailed medical software programs which offer the nurse suggested choices for responses, presented in a flowchart format. The main goal of this service is to triage calls to determine if patients can be treated through self-care, if they require a clinic visit, or actually require evaluation and/or treatment in an ER. This form of demand management not only has the ability to eliminate unnecessary visits to clinics and ERs, but also increase patient convenience and improve patient satisfaction. In COA 4, this system would be used to improve access to MACH and control inappropriate visits to local ERs. (MACH Nurse Advice PAT 1997)

The advantages to such a system include not only cost-savings to MACH, but also potential savings in TRICARE Prime co-pays for beneficiaries and reductions of unnecessary FHC or TMC visits. There may also be an increase in beneficiary satisfaction from not having to wait all night in a crowded emergency room. It is expected that such a service could also perform the additional function of scheduling patient appointments into CHCS when it is determined that a primary care visit is necessary.

Advice line nurses are trained to talk the caller through basic self-care steps which hopefully result in producing enough information about the condition to effectively treat it, or to determine if an ER visit is actually warranted. The supporting software program is important, but the importance of the competence of the nurse cannot be over-emphasized. This phone-duty requires above-average communication skills, talent and intuition, since

much of the opportunity for the nurse and caller to exchange the same degree of information they could in person is often lost. That which could normally be seen, touched, heard, and physically-expressed is reduced to mere sound over a telephone. (Anders 1997)

The MACH Nurse Advice Line PAT developed two options for acquiring this service. The first option was to purchase the equipment and hire the additional staff that would be needed to perform this mission in-house at MACH. Depending on which arrangement was decided on, this was estimated to cost from \$200,000 to \$500,000 for the equipment and software, plus the requirement to hire an additional 5 to 9 full-time equivalents (FTE), at a cost of approximately \$53,000 per year per RN. For the first year of operation, this would cost from \$465,000 to \$977,000, with subsequent years ranging from \$265,000 to \$477,000. The second option was to pay a contractor to perform this service. The cost for such a service contract is estimated to range from \$400,000 to \$700,000 per year. (Wallace 1997), (MACH Nurse Advice PAT 1997)

The Soldier Assessment Center (SAC) is intended to treat only SITs and active duty soldiers. It is not intended to be an after-hours TMC, but would operate only when the TMC and Battalion Aid Stations (BAS) were closed. This SAC would be located at either the TMC building or the present ER location, and would consist of two enlisted military providers, which would be either medics (91Bs) or licensed practical nurses (LPNs) (91Cs), who would perform algorithm-based assessment and disposition. This involves the use of a standardized flowchart of well-defined, unambiguous choices which the 91B/C uses to assess the patient and determine if the case requires a physician.

These 91B/Cs would have access to a MACH, in-house physician in the event the patient presented with other than a minor illness or injury. The physician would have the option of either treating the soldier, or transferring him to a local civilian ER. The MACH ambulance service would be co-located with the SAC, which would mean that a dedicated paramedic ambulance crew that could provide emergency transport would be immediately available if needed. (MACH PC PAT 1997)

Extending access to the FHC involves operating this facility from 0800 to 1200 on Saturdays and Sundays. These hours would be for TRICARE Prime enrollees, and by appointment only. However, appointments could be made through the medical advice telephone line. Weekend FHC hours would be held in the same location as during weekdays, but staffing requirements would be reduced to three physician extenders and five support staff. (Zager 1997)

Extended hours for the TMC would include adding evening hours from 1600 to 2300, as well as the addition of Sunday hours from 0700 to 1200. These additional TMC hours would be held in the same area as traditional clinic hours. Staffing requirements for these hours would be the same as current Saturday clinic requirements, which consist of one physician assistant, one RN or LPN, and three para-professionals. (Money 1997)

The cost of COA 4 was determined in the following manner. Additional FHC and TMC hourly costs were based on the historical costs of operating the FHC and TMC, with adjustments made for differences in staffing. The SAC costs were based on pay rates for the 91B/Cs and general supply costs for the TMC, which is generally based on algorithm-directed care. The cost for the in-house physician was not included, since this is

essentially the same physician that was on-call as the Medical Officer of the Day (MOD) in the past at MACH. The MOD is permitted to sleep in the facility and would only be called if needed. The MOD is therefore considered to be a contingency asset, and is expected to report for duty the following day. The cost for the medical advice line service is based on an average of the estimates for contracting this service. This contract cost was chosen over the option of performing this mission in-house, because the cost of the first year in-house would exceed funding for the current ER physician contract, which would be used to pay for such a service.

The first step in estimating the cost of COA 4 is to determine the cost for the medical advice line service contract. The price quoted to the PAT was \$400,000 to \$700,000 per year. In continuing the conservative accounting principles used throughout this study, the highest figure quoted will be used. Therefore, the estimate for the medical advice line is \$700,000 per year, \$44,950.40 less than the annual ER physician contract.

Family Health Center Costs

The next step is to estimate the cost of operating the FHC during extended hours. Table 13 lists the cost per hour for various health care providers. These are based on averages for the number of, and pay rate for, each type of provider presently employed in the FHC. The logic for this calculation is that there is an equal chance that any of the physician assistants or nurse practitioners could be scheduled to work a weekend shift. The same is true of the nurses and para-professionals.

TABLE 13
FAMILY HEALTH CENTER STAFF PAY RATES

| AVERAGE FHC HOUR PAY RATES | |
|---|---------|
| Civilian Physician Assistant/Nurse Practitioner | \$22.94 |
| Military Nurse Practitioner | \$26.08 |
| Civilian Registered Nurse | \$18.60 |
| Military Registered Nurse | \$17.04 |
| Civilian Paraprofessional | \$10.67 |
| Military Paraprofessional | \$11.67 |

The hourly pay rate was calculated by totaling the monthly pay for each person in each category that presently works in the FHC. This was then divided by the average number of hours each person in each category historically works in the FHC. For example, the military registered nurses working in the FHC that might be scheduled to work weekends consist of an O-1 with almost 2 years of active service, and an O-3 with approximately 16 years active service. The rates were calculated by totaling the monthly pay for each. For the O-1: base pay = \$1,796.10, basic allowance for quarters = \$361.50, basic allowance for subsistence = \$ 154.16. This totals \$2,311.76 per month.

The average hours worked per month is estimated at 200 (10 per day, 5 days per week). The hourly pay rate is therefore \$11.56. The O-3 monthly pay equals \$4,505.36, which equates to \$22.53 per hour. Since these two nurses are assumed to have an equal chance of being scheduled to work, the hourly rate for military RNs is calculated as an average of the two hourly rates, which equals \$17.04 per hour. The same logic is used for

all other categories of providers. (Jones 1997) ([Http://www.ncts.navy.mil](http://www.ncts.navy.mil) 1997)
([Http://www.teamwest.com](http://www.teamwest.com) 1997)

To calculate the cost for operating the FHC for 4 hours on Saturdays and 4 hours on Sundays, the historical operating costs were used for the FHC, minus costs for staff pay. This was excluded and recalculated separately because the staffing on weekends would be considered to be at a lower level than during the week, consisting of three physician assistants or nurse practitioners, and five support staff. (MEPRS 1996), (Zager 1997)

The costs are thus calculated as follows. The historical cost to operate the FHC (less personnel) is determined with MEPRS data and divided by 594 hours, the hours the FHC was open during the MEPRS data period. All operating costs, minus personnel costs for the three month MEPRS reporting period equals \$844,094.73. Dividing this by 594 hours equates to an hourly rate of \$1,421.03. The total cost for staffing during the 8 hours of weekend operations is determined by taking the average total, hourly cost for 3 physician assistants and/or nurse practitioners (civilian and military), and the average total, hourly cost for support staff (civilian and military). This is as follows: Physician assistant/nurse practitioner ($\$22.94 + \$26.08 / 2 = \$24.51$; paraprofessional ($\$10.67 + 11.67 / 2 = \11.17). (MEPRS 1997)

Staffing requirements for physician assistants/nurse practitioners are estimated at 3 per hour ($3 \times \$24.51$), which would cost \$73.53 per hour. For paraprofessional staffing, the estimate is 5 per hour ($5 \times \$11.17$) which would cost \$55.85. The total operating cost per hour is thus: ($\$1,421.03 + \$73.53 + \$55.85 =$) \$1,550.41. In actuality, this cost may

vary based on the weekend patient flow rate and supplies, ancillary services, and pharmaceuticals consumed or ordered. The cost of the addition of Saturday and Sunday TMC hours is therefore \$12,403.28 per week (8 hours x \$1,550.41), or \$644,970.56 per year.

Troop Medical Clinic Costs

The TMC presently is open to see patients Monday through Friday from 0700 to 1600 and on Saturdays from 0700 to 1200. It is estimated that staffing requirements for the 5 hours of Sunday operations, as well as the additional weekday hours from 1600 to 2300, would be identical to how it is now staffed on Saturdays. This additional staffing requirement would consist of one physician assistant, one RN or LPN, and three para-professional. Cost per hour can thus also be determined from current operational rates (minus staff), plus the revised cost of the health care providers. (Money 1997) (MEPRS 1997)

The costs are calculated as follows. The historical cost to operate the TMC (less personnel) is determined with MEPRS data and divided by 687 hours (the hours that the TMC was open during the MEPRS data period. All operating costs, minus personnel costs for the three month MEPRS reporting period equals \$635,880.25. Dividing this by 687 hours equates to an hourly rate of \$925.59. The hourly cost of staffing for the extended weekday and Sunday hours is based on: one physician assistant at \$24.08 per hour; one nurse at \$17.48 per hour; and 3 para-professional at an average rate of \$9.99 per hour (which totals \$29.97 per hour). The total operating cost for the TMC per hour on Sunday is thus: $(\$925.59 + \$24.08 + \$17.48 + \$29.97 =) \$997.12$. In reality, this too

may differ, based on Sunday and weekday evening patient flow rates and supplies, ancillary services, and pharmaceuticals consumed or ordered. These demand rates will likely be affected by the closure of the ER, and the additional primary care hours.

The additional TMC hours at this rate equals 40 (1600 to 2300 Monday through Friday, and 5 hours on Sunday). This additional cost for extending the TMC hours of operation therefore $(40 \times \$997.12) = \$39,884.80$ per week, or \$2,074,009.60 per year.

TABLE 14
AVERAGE TMC STAFF PAY RATES

| AVERAGE TMC HOUR PAY RATES | |
|-----------------------------------|---------|
| Physician Assistant | \$24.08 |
| Military Nurse | \$17.43 |
| Military Paraprofessional | \$9.99 |

Soldier Assessment Center Costs

The SAC would be staffed by 91Bs and 91Cs, who have already been determined to cost an average of approximately \$9.99 per hour. If the SAC is staffed consistently with two soldiers, the total weekly cost would be $(\$9.99 \times 2 = \19.98 per hour.

Additional costs include only medical and pharmaceutical supplies at a comparable rate as is seen at the TMC. Ancillary costs for radiology and pathology are excluded, since 91Bs and 91Cs would not order these. Overhead is also excluded, since this cost would be relatively insignificant for one room in a building that is already included in the overhead

step-down allocation for all wards and other services in operation.

It is very likely that these additional costs for the SAC would be considerably lower than they are at the TMC, since such costs are generally variable, and demand at the SAC would assumably be low. When the TMC is in operations during normal hours, the staff is nearly 6 times greater than it would be at the SAC. However, the use of conservative estimates are deemed acceptable. Therefore, calculations will be based on the assumption that the SAC staff will see patients at the same rate as the TMC staff during normal duty hours. Hourly rates for additional costs at the TMC will be multiplied by a factor of 0.167 ($1 \div 6 = 0.167$), to calculate the costs for the SAC.

An average cost per hour was first calculated for the TMC since it is not logical to use the TMC's average cost per visit. This was developed by dividing the applicable cost centers by the total number of hours the TMC was open during the period that MEPRS data was available for. The results of these costs are included in table 15 below. These same costs were used with the factor mentioned above to calculate hourly SAC costs.

TABLE 15
ESTIMATED AVERAGE COST PER HOUR FOR THE MACH TMC AND SAC

| ESTIMATED AVERAGE COST PER HOUR FOR THE MACH TMC & SAC | | |
|---|---------------|----------------|
| COST CENTER | TMC | SAC |
| PHARMACY | \$235.49 | \$39.23 |
| MILITARY LABOR | N/A | \$19.98 |
| SUPPLIES | \$18.12 | \$3.02 |
| | TOTAL: | \$62.23 |

If the SAC is open whenever the TMC is not, it would be in operation a total of 78 hours per week. Therefore, the total annual cost for operating the SAC is $[(\$62.23 \times 78) \times 52] = \$252,404.88$.

The final cost for COA 4 has already been calculated in COA 3. This is the cost for treating all emergent and urgent cases at local civilian ERs. The total for this came to \$197,616.32 for a six month period, or \$395,232.64 per year. With this information the total cost of COA 4 is then calculated.

TABLE 16
ESTIMATED TOTAL COST FOR COA 4

| SERVICE | COST |
|-------------------------------|-----------------------|
| MEDICAL ADVICE LINE | \$700,000.00 |
| ADDITIONAL FHC HOURS | \$644,970.56 |
| ADDITIONAL TMC HOURS | \$2,074,099.60 |
| SOLDIER ASSESSMENT CENTER | \$252,404.88 |
| TREATMENT COSTS FOR LOCAL ERs | \$395,232.64 |
| TOTAL: | \$4,066,707.68 |

The annual cost to operate the MACH ER is estimated at \$4,463,505.16. The implementation of COA 4 would therefore result in an estimated net savings of \$396,797.48 per year. (MEPRS 1997)

COA 4 would not only result in a fiscal savings, it would also significantly increase access to primary care for the Fort Jackson community. This is therefore determined to be an acceptable COA.

DISCUSSION

The COAs evaluated above may have additional costs which are difficult or even impossible to measure. The image of MACH and the AMEDD may suffer if either COA 3 or 4 are implemented. This may result because of two reasons. First, these COAs involve reducing the ability of CHAMPUS/TRICARE-ineligible military retirees to access health care at MACH. Though it may seem unfair, this is a reality which has been forced upon the MHSS by Federal budgetary policy. The impact of such an action may very well serve to harm the morale of not only these individuals who served their country in time of need, it may also be detrimental to the morale of those soldiers still on active duty. The implementation of COA 3 or 4, though fiscally sound, may cost the US Military in terms of public image.

Receiving permission to close the ER may not be as simple as it may seem. Before the ER can be closed, approval must be granted from various levels of command. This is outlined in Department of Defense Instructions (DODI), Number 6015.20, dated 3 December 1992. The procedures in this DODI apply to the closing of the MACH emergency room. In paragraph F.2, it is stated that "Any MTF or DTF closure or reduction in the level of care, as described in enclosure 1, subsections 1.b.(5) through 1.b.(6) , shall be reported through the chain-of-command and the Deputy Assistant Secretary of Defense (Health Services Operations), to the Assistant Secretary of Defense (Health Affairs) for approval 120 days before the action is scheduled. After he approves it, but no later than 90 days before the action is scheduled, the ASD(HA) shall forward the report to Congress, as required by Pub. L. No. 101-510, Section 716 and Pub. L. No.

102-172, Section 8070 (references (b) and (c)).” Enclosure 1, subsection 1.b.(5) describes “permanently closing services,” which is the situation in this case. The procedures then, are as follows:

1. The installation commander must grant permission to close the service after first being informed if this action may result in adverse publicity.
2. The intention to close the service must then be reported through the military chain of command no less than 120 days prior to the date of the scheduled closure. For MACH, this chain of command includes:
 - a) The Southeast Regional Medical Command
 - b) The U.S. Army Medical Command
3. The DASD(HSO) will forward this to the ASD(HA) for approval.
4. After the ASD(HA) has approved this request, he will forward it to Congress no later than 90 days before it is scheduled for closure.
5. The Congress will make the final approval or disapproval regarding the closure.

The following information must be included with the request to close the ER:

1. Name and location of the MTF.
2. The type of change, where appropriate by the Medical Expense and Performance Reporting System (MEPRS) specialty area.
3. The effective date of the change, where appropriate by the MEPRS specialty area.
4. The reason for the change.
5. The estimated workload changes, where appropriate by the MEPRS specialty area, in the number of outpatient visits, admissions, occupied bed days, or ancillary service units

and, when applicable, by category of beneficiary.

6. The projected savings to the Government from the change, both in the military and civilian staff and funds, by fiscal year.
7. The impact on the Civilian Health and Medical Program of the Uniformed Services and MEDICARE costs in the facility's catchment area.
8. The net resources resulting from the proposed change.
9. The impact on beneficiary cost-sharing.
10. An explanation of the alternative ways to provide care to the persons served by the facility (that will not result in adverse consequences to such persons).
11. An identification of the alternative selected and the cost, if any, to those persons to receive such care. (Mendez 1992)

Another impact which might result from either of these COAs involves the future of MACH. The study to transfer ICU assets to the DVAMC, combining wards, and the move to close the ER, may have a significant, negative impact on the operational structure of MACH. Once a facility forfeits the ability to perform a mission, it becomes exceedingly difficult to recapture that capability. Implementing either COA 3 or 4 may make good business sense, but once done will no doubt be difficult to undo. The strategic, and perhaps even the individual implications on such a move should therefore be carefully considered before any such action is taken. As Omar Khayyam warned in The Rubaiyat:

*The Moving Finger writes; and having writ
Moves on: nor all thy Piety nor Wit
Shall lure it back to cancel half a Line,
Nor all thy tears wash out a word of it.*

Gaining permission to close the MACH ER will not be easy, but once closed, it is unlikely that it can ever be reopened.

CONCLUSIONS AND RECOMMENDATIONS

As was stated previously, the purpose of this project was to assist the leadership of MACH in making decisions regarding the future structure of hospital emergency medical assets. Based on the data which has been collected, evaluated and presented here, it is recommended that the Moncrief Army Community Hospital emergency room be closed, and the resources used to operate it be divested for the implementation of COA 4.

As mentioned before, this COA improves both the efficient utilization of resources and serves to increase the ability for the Fort Jackson community to access primary health care. Although this COA appears to make plans to reduce the ability of CHAMPUS/TRICARE-ineligible beneficiaries to access care, it may actually have the effect of improving their ability to receive health care at MACH. Colonel R. Bernard Chapman, Jr. the MACH Deputy Commander for Administration has suggested that if the medical advice line has the desired effect of reducing unnecessary demand for care, the result may be to open additional appointments at the FHC for those Medicare-eligible beneficiaries who can access care now only on a space-available basis. The plan developed by the MACH PC PAT may very well improve access to care for all beneficiaries.

COA 3 is also an acceptable option. However, this may serve to be something of a disincentive for people to enroll in TRICARE Prime, since it would require that SITs and military dependent family members be treated in the same location and at the same times. It would also not provide the additional opportunities for access to care that COA 4 would. It would however, improve the efficiency with which the present ER resources are utilized.

APPENDIX: ABBREVIATIONS AND ACRONYMS

ACC - Acute Care Clinic
ACV - Actual Care Value
ADS - Ambulatory Data System
AFB - Air Force Base
AMEDD - US Army Medical Department
ASD - Assistant Secretary of Defense
ATTN - Attention
AVG - Average
BAS - Battalion Aid Station
BPA - Bid Price Adjustment
CHAMPUS - Civilian Health And Medical Program of the Uniformed Services
CHCS - Composite Health Care System
COA - Course Of Action
CPO - Civilian Personnel Office
CSD - Clinical Services Division
DEERS - Defense Enrollment Eligibility System
DEPT - Department
DCCS - Deputy Commander for Clinical Services
DHCP - Decentralized Hospital Computer Program
DOD - Department Of Defense
DODI - Department Of Defense Instructions
DPCCM - Dept of Primary Care and Community Medicine
DTF - Dental Treatment Facility
EAS - Emergency Ambulance Service
E1 - Enlisted Pay Grade, Level 1
E2 - Enlisted Pay Grade, Level 2
EBC - Enrollment-Based Capitation
EKG - Electrocardiogram or ECG
EMS - Emergency Medical Service
ER - Emergency Room
FAS - Field Ambulance Service
FHC - Family Health Center
FTE - Full-Time Equivalent
FY - Fiscal Year
GS - Government Service
HA - Health Affairs
HIV - Human Immune Deficiency Virus
HSC - US Army Health Services Command (renamed MEDCOM)
ICU - Intensive Care Unit
JCAHO - Joint Commission for the Accreditation of Healthcare Organizations

APPENDIX: ABBREVIATIONS AND ACRONYMS (continued)

LPN - Licensed Practical Nurse
MACH - Moncrief Army Community Hospital
MCD - Managed Care Division
MCP - Managed Care Plan
MEDCEN - Medical Center
MEDCOM - Medical Command (US Army)
MEDDAC - Medical Activity
MEPRS - Medical Expense and Performance Reporting System
MHSS - Military Health Service System
MOD - Medical Officer of the Day
MOU - Memorandum of Understanding
MTF - Military Treatment Facility
NAS - Non-Availability Statement
O1 - Officer Pay Grade, Level 1
PACU - Post-Anesthesia Care Unit
PAT - Process Action Team
PATCAT - Patient Category
PC - Primary Care
PUB. L. - Public Law
RAPS - Resource Analysis and Planning System
RBRVS - Resource-Based Relative Value Scale
RMD - Resource Management Division
RMH - Richland Memorial Hospital
RN - Registered Nurse
RVU - Relative Value Unit
SAC - Soldier Assessment Center
SERMC - Southeast Regional Medical Command
SC - South Carolina
SIT - Soldier-In-Training
SOP - Standing Operating Procedures
SVC - Service
TF - Task Force
TMC - Troop Medical Clinic
TRADOC - Training and Doctrine Command
TRICARE - TRICARE is a DOD, tri-service managed care plan
TTL - Total
US - United States
VA - Department of Veterans Affairs
VH - Veterans Hospital
91B - US Army Medical Specialist
91C - US Army LPN

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